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THE AMATEUR
ENTOMOLOGISTS'
SOCIETY**



Edited by
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and
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The Amateur Entomologists' Society
355 Hounslow Road, Hanworth, Feltham, Middlesex

GENERAL INDEX

- Algarve (Portugal), Observations on butterflies, 121
- Aculeata, news, 3
- Accessory before the fact, 59
- Boxing day find, A, 100
- Book Reviews—
 - Butterflies of Georgia, 28
 - Crickets & Grasshoppers of the British Isles, 29
 - A Field Guide to the Insects of Great Britain and Northern Europe, 28
 - A Survey of the Macrolepidoptera of Croydon & N. E. Surrey, 132
 - Wasps—Biology & Natural History of Solitary and Social Wasps in the British Isles, 152
- Brazilian Insects, notes on, 82, 129, 154
- British Swallowtail, Breeding of, 81
- Bumble Bees, 24, 25
- Bush Crickets, Culturing the eggs of, 69
- Burnet Colony, New Forest, 77
- Butterflies, a decade of, 97
- Butterflies, feeding habits, 16, 17
- Butterflies, on Isles of Scilly June 1973, 91
- Butterflies, obtaining ova, 27
- Butterflies, vanishing, 145
- Caterpillars, preservation of, 5
- Collecting Notes, Macrolepidoptera in Burnley 1973, 8
- Collecting Notes, The smaller moths, 1, 37, 133
- Collembola, distribution of furcula-bearing, 73
- Conservation Group, 47
- Conservation, Joint Committee for, 54
- Crane flies, an introduction to, 18, 142
- Drone Assembly, 66
- Drosophila, balsa wood model, 125
- Dwarfs, more about, 102
- Eastern Austria, expedition to July/August 1973, 115
- Editorial, 1, 37, 85, 133
- Egg Laying Butterflies, a cage for, 105
- Elder, as a foodplant, 152
- Erebia ephiphron in Western Lakeland, 72
- Ethyl Acetate, as a preservative, 26
- Exhibition, 1973 Annual, 40
- Exotic Entomology Group, 108
- Fox Moth, rearing, 128
- Glow Worm, the, 4
- Greece, May 1973, 12, 55

Green Hairstreak, rearing, 104
Hampshire, two weeks in, 50
Holly Blue, rearing, 104
Hymenoptera Aculeata, 24
Insects, mounting on polystyrene squares, 29
Italian Butterflies in August 1973, 61
Larva cage from car airfilter, 156
Lasiommata petropolitana, breeding of, 79
Lesser Swallow Prominent, breeding the, 5, 107
Midlands Group Notice, 108
Mountain Foray, 136
Nocturnal Efforts, March—May 1973, 52
Oleander Hawk, rearing, 131
Pale Lemon Swallow, common or rare?, 132
Phasmids, rearing tropical, 30
Photographic group, 45
Pigmentation of Lepidoptera, Introduction to, 90
Report, Annual for Council 1973, 85
Report, Treasurers for 1973, 86
Season of 1973, some comments on, 110
Sugaring, 10
Syntomis phegea, rearing, 101
Unusual Butterfly pairings, 103
Wasp & Hornet distribution scheme, 107

CONTRIBUTORS

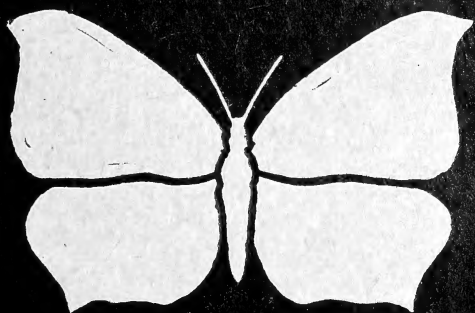
- Archer, M. E., 107
Arak, P. A., 103
Ball, N. A., 50
Bathe, G. M., 73
Bradford, E. S., 133
Brassington, I., 152
Brock, P. D., 101
Butter, J. S., 17
Cooke, N. H., 86
Cooper, B. A., 66
Cordell, P. A., 5
Cribb, P. W., 1, 5, 12, 28, 55, 132, 136
Emmett, A. M., 1, 37
Fearnehough, T. D., 16
French, R. A., 11
Gardiner, B. O. C., 37, 85, 133, 145, 153
Gardiner, C., 153
Gossling, N. F., 121
Green, J., 81
Gregory, J. L., 5
Hanson, F. C., 82, 129, 154
Heath, P. M., 110
Hilliard, R., 40
Hopkinson, N., 30
Hoyle, R., 25, 141
Lonsdale, D., 47
Mardle, K. W., 29, 125
Moon, D. J., 108
Moore, B. W., 153
Mosley, K. A., 102
Parker, R., 131
Pittaway, A. R., 115
Platts, J., 52, 104, 107, 128, 132
Plester, L., 45, 59, 79, 105, 156
Porter, K., 72
Roche, J., 85
Rushton, G., 8
Samways, M. J., 26, 68
Simpson, M. S. L., 91
Smith, G. R., 61
Stubbs, A. E., 18, 142
Tilley, D. A., 108
Waddington, L. G. F., 10
Waring, P., 77
Willmott, K. J., 97
Wootton, A., 4
Young, C. A., 101

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EDITORIAL

The size of the Bulletin remains at over 36 pages for this first issue of a new volume. At the moment only costs limit the size and a return to the 36 page issues may be necessary. However contributions have kept rolling in so that the Editor is able to exercise some choice as to content so that a more balanced Bulletin is possible. The majority of our members are Lepidopterists but the aim is to cater for all members and the inclusion of articles on other groups may fire new interests. An increased emphasis on the conservation of habitat means that the amateur must acquire a wider appreciation of the total insect fauna if he is to play a part in ensuring its continuance. With the larger amount of material in hand there must be some delay in publication of many items but please continue to send in your contributions to maintain a full file for the Editor.

The Editorship now passes to Brian Gardiner, a member well known to many, after a brief sojourn with me and the Council wishes him a long and successful term of office.

P. W. Cribb (2240)

COLLECTING NOTES—FEBRUARY 1974

The smaller moths

The three drawings by Mr. J. S. Noyes show Gelechiidae whose larvae may be found in the early months of the year. *Dichomeris marginella* Fab. is a fine moth with a wingspan of up to 16 mm. The forewings are golden brown with the costa and dorsum creamy white. This is also the colour of the thorax and head, including the prominent palps. The hindwings are pale grey. The larva, which is grey with brown markings, feeds on Juniper, *Juniperus communis* L., and is to be found from April onwards. It spins a web, usually amongst the dead inner foliage, from which it sallies forth to feed on the new growth. The insect pupates in the spinning and the adults emerge in July. It occurs with its foodplant throughout England; my own specimens are from Surrey, Berkshire and Westmorland.

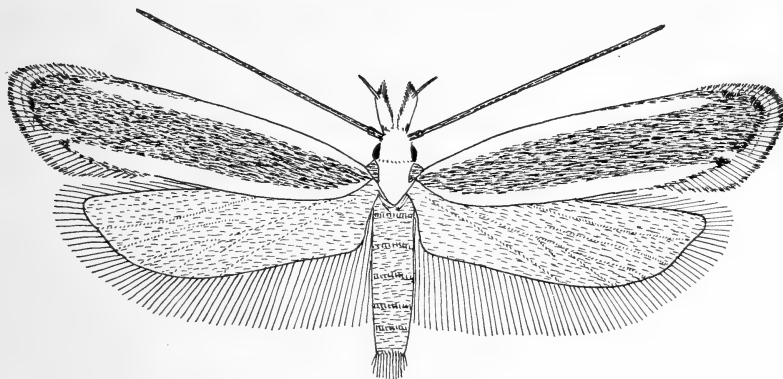
The second illustration shows *Caryocolum tricolorella* Haw. The "three-coloured" forewings are red-brown with black and white markings. The larva which is white with pink stripes and a black head lives in spun terminal shoots of Greater Stitchwort, *Stellaria holostea* L., and may be full fed at any time between the end of February and April, depending on the seasonal temperature. The moths start to emerge in June. This is a common species in the south of Britain but is scarcer in the north and may not occur in Scotland.

The third drawing is of *Mirificarma mulinella* Zell. which is soberly clad. The forewings are pale ochreous brown with variable fuscous irroration; this commonly takes the form of a longitudinal streak as shown in the illustration. The hindwings are very pale grey, rather lighter than the picture suggests. The black-headed green larva feeds in the flowers of Gorse, *Ulex* spp., and Broom, *Sarothamnus scoparius* (Linn.) Koch, in April and May, a small hole in the petals betraying where it tunnelled its way inside. The adult flies in July and August and is common throughout Britain.

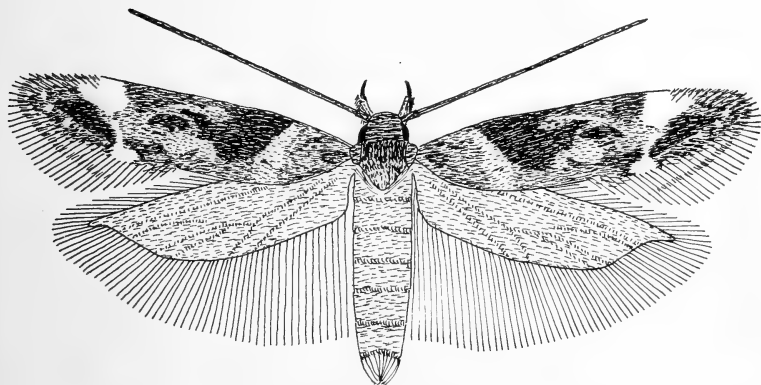
I selected *mulinella* for illustration as I intend to devote the rest of this article to broom-feeding microlepidoptera and this was the only one of which a drawing was available. There are three species which mine the bark of the shoots of the previous season; these are *Phyllonorycter scopariella* Zell., *Leucoptera spartifoliella* Hubn. and *Trifurcula immundella* Zell., all of which I bred successfully in 1973. The mines are easily distinguished. *P. scopariella* makes a short mine and as it spins the interior with silk, which contracts, the skin rises like a blister. The other two make long gallery mines starting six inches or so from the tip of the twig and changing direction more than once as the larva works its way upwards or downwards in parallel courses. The mines are black and conspicuous and are separable because whereas *spartifoliella* starts by mining upwards from the egg, *immundella* sets off downwards, i.e. towards the stem. To clinch the matter, with *immundella* the egg is relatively large and conspicuous while with *spartifoliella* it is not to be seen, probably because it is inserted into the rind by the ovipositing female. I have found *scopariella* mainly on young low saplings, but the other two may occur on bushes of any age. The mines of *immundella* are in evidence from the end of October onwards, but I have not found the other two before the early spring.

These species are a problem to rear because Broom dries up quickly if exposed to the air and goes rotten if enclosed in a container. My own solution is crude but effective. The larvae should not be collected before late April, by which time they will be more or less full fed; the twigs should then be snipped off about a foot below the mine. Then I fill a polythene bag with damp sphagnum moss, insert the butt ends of the twigs and seal the bag fairly tightly with a string below the mines. Next I put the whole issue, twigs, bag and all, into a lady's nylon stocking of sufficiently fine mesh to prevent the tiny larvae from escaping, tie the ends and stand the sausage upright in a jar. Treated thus, the shoots stay fresh for up to a fortnight and do not go bad. The larvae of *spartifoliella* crawl upwards on leaving their mines and spin their white cocoons at the tips of the twigs or on the nylon. Those of *immundella* go downwards and spin up between the bunched stems or penetrate through into the moss which they like for pupation; had the twigs stood in water they would have drowned themselves. The larvae of *scopariella*, of course, pupate inside the mines.

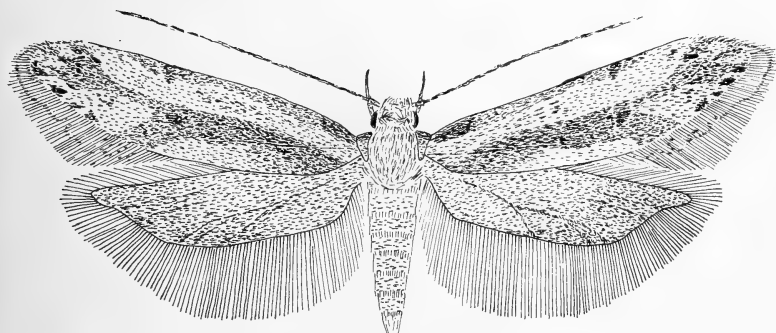
While you are collecting these mines you will probably also find



1. *Dichomeris marginella* Fab.



2. *Caryocolum tricolorella* Haw.



3. *Mirificarma mulinella* Zell.

All figures are reproduced about six times natural size.

Depressaria larvae which will feed happily in company with the smaller fry. First there are the ubiquitous *Agonopterix nervosa* Haw. (= *costosa* Haw.) and the more local *A. assimilella* Treits. which feed in April between spun twigs. Last year I rejected the former as unwanted but bred the latter; the larvae pupated in cocoons spun in folds of the nylon. Then our text-books give *A. atomella* Schiff (= *scopariella* Hein.) as feeding rather later on the leaves of Broom. First, these are two different species and, second, apparently neither is *atomella*; the moths ascribed to that name should be re-labelled *pulverella* Haw. I have found *pulverella* only on Dyer's Greenweed, *Genista tinctoria* L., which may be its sole foodplant. *A. scopariella* certainly feeds on Broom. While *nervosa* and *assimilella* overwinter as larvae, *scopariella* does so as an adult, and this is why its larvae feed later in the spring. Perhaps some more knowledgeable reader will answer a need by telling us the full story of the differences in the biology and imagines of *pulverella* and *scopariella*. Lastly, look out for window-feeding in the young leaves of Broom, for that will be the sign of the larva of *Coleophora saturatella* Staint., which feeds in a queer case, shaped like a pagoda.

A. M. Emmet (1379)

THE GLOW-WORM (LAMPYRIS NOCTILUCA LINN.)

Mr. C. P. J. Samson's article on the Glow-worm—*Lampyrus noctiluca*, not "noctiluna"—in the November 1973 *Bulletin*, while interesting and useful, includes at least one basic error that I feel should be corrected. The glow is certainly *not* confined to the female insect. Males have very small luminous areas at the tip of the abdomen, as do the larvae; while even the tiny spherical eggs and (to some extent) the pupae can glow, as I described in a recent B.B.C. "Living World" programme (July 22). I have, at this moment in time (November 1973), a number of glow-worm larvae which I am hoping to rear under as near natural conditions as possible, allowing them to hibernate during the winter. All the evidence appears to suggest that *L. noctiluca*'s life history extends over 3 years, although in fact very little is known about it.

Your readers may be interested to know, incidentally, that the British Naturalists' Association, via its official journal *Country-Side*, has been conducting a nationwide distributional survey of the glow-worm since 1969. A further summary of records received, as well as an updated distribution map, will be published in our spring 1974 issue, copies of which may be obtained from the Association's Hon. Secretary, Mrs. K. L. Butcher, "Willowfield", Boyneswood Road, Four Marks, Alton, Hants., GU34 5EA, price 30p. Membership of B.N.A., which includes the three copies of the magazine published annually, costs 75p.

With regard to the use of foreign Lampyrids (and Elaterids) for lighting purposes, readers may like to be referred to a paper which the late I. M.

Allen and I wrote for *The Entomologist's Monthly Magazine* in 1963. This summarizes such evidence as we could find for this particularly fascinating aspect of beetle-lore on a world scale.

Anthony Wootton (3331)
Editor, *Country-Side*

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BREEDING THE LESSER SWALLOW PROMINENT, *Pheosia gnoma* Fab.

I was surprised to read in the November Bulletin (Vol. 32 No. 301) of the difficulty experienced by some in rearing this species. I captured a female in my MV light trap at Bodelva, Cornwall on 13th August 1972 and she laid a few ova for me before dying a few days later. I reared the resulting larvae on Birch, *Betula* sp., in transparent plastic sweet jars, supplied free from my local sweet shop, a few larvae to a jar. Each jar was covered with a piece of my wife's old stockings, secured with an elastic band. The sprigs of food-plant were changed every two or three days, as the stalks were not in water.

When nearly full-grown, each larva was placed into a jar on its own. The jar contained garden soil to a depth of about three inches and a leafy birch spray was added. The moths duly emerged in June, 1973. Not being aware of the reputation of this species for difficulty, I did not keep records of the number of ova laid nor larval losses or failed pupae and emergences. However the percentage of survivals to adulthood was good.

John L. Gregory (4116)

THE PRESERVATION OF CATERPILLARS

Dr. P. Houyez of Liege has kindly agreed to the publication of his notes on the technique of preservation of lepidopterous larvae by means of injection.

The two methods of conservation most suitable for collections of caterpillars are (1) by heat treatment (drying) and (2) by Injection. Drying consists of filling the emptied larval skin with air and drying out the skin so that the larva is kept in a state as near as possible to the natural. The main disadvantages to this system are that the finished larva may look distorted, transparent and natural colouring may be lost. The Injection method consists of replacing the inside of the caterpillar with a preparation of coloured wax. Cracking of the skin, darkening and greasiness are dis-

advantages but researches over some 28 years are resolving these. Caterpillars treated by the injection method are nearest to the living in appearance and add to a collection the richness of colour and shape seen in the larval forms of our Lepidoptera.

Method. This is in three stages:

1. *Evisceration of the larva.* Place the larva in a refrigerator at 4°C immediately after the last moult and leave it there from eight days to a month until there is no reaction to a pinch—the larvae are best kept in plastic boxes which should be opened and dried daily. During this artificial hibernation there is a slow destruction of body fats, dehydration and emptying the gut—all essential factors in obtaining a good end result. The larva is then anaesthetised with ether and then plunged into water at 80°C. The anal tube (main gut) is now easily removed by soft pressure on the body which does not damage the skin. The tube is pulled inside out like a glove and then cut 1 cm. from the anus and the rest of the contents of the body are gently forced out through it.

2. *Injection.* The anal tube is secured to a pipette of glass by a double knot of cotton thread, the ends covered with adhesive tape and the whole secured by a double binding of fine copper wire (as used for electric windings). This prevents loss of wax and slipping of the knots on the pipette. A mixture is then made as follows:

Paraffin wax 1 part; Beeswax 2 parts; Gum Arabic a small quantity. This mixture is gently melted in a water basin and an addition of paint is made to the colour of the larva being treated.

The air is pressed out of the larval skin and the mixture is run into the pipette till it is full up to the ligature. Protecting the larva with a piece of cardboard as a shield, reheat the wax and blow down the pipette forcing the mixture into the body. The larva is then plunged into water at 90°C and then re-blown up under cold water. It is then replunged into the water at 90°C to destroy the harmful enzyme (tyrosinase) which causes darkening.

3. *Final fixing.* In order to prevent cracking or splitting of the skin, the larva is plunged again between 3 and 24 hours later into a fixing liquid composed as follows:

Sodium chloride	2 gr.
Distilled water	60 gr.
Alcohol 90°	40 gr.
Formalin 40%	1 to 3% according to size of larva.

Some species may be kept in this liquid if necessary but they may be removed, thoroughly dried and suitably mounted.

(Translated by PWC)

Notes on the method used to preserve larvae by Heat treatment

1. Larvae killed with a drop of chloroform.
2. Larvae placed on sheet of blotting paper with head facing towards you.

3. Body contents are removed via anal orifice by rolling out with a round pencil. Roll **SLOWLY AND GENTLY** from head to rear of larva. This **MUST** be done very gently and with light pressure only on the larva. Do not try to roll all the contents out at one time. Results of too much pressure may be:
 - (a) Skin will burst.
 - (b) Pigmentation and markings will be destroyed.
 - (c) Hairs will be broken off.
4. Insert end of glass tube of appropriate size into the anal orifice and inflate with bellows to **JUST UNDER NORMAL SIZE**. Hold skin on the tube by light pressure with finger tip.
5. Hold skin in oven when it will expand slightly at first. Adjust pressure in skin by means of the bellows to retain it at normal size until dry. The skin will dry from head to rear and towards end of drying it will be found that the skin will adhere to the glass tube allowing the finger to be taken away. Do not let the skin touch the sides of the oven. I find that drying takes from 3 to 10 minutes, according to the size of the larva.
6. When all the skin has dried, remove from glass tube by twisting gently or pushing off with pin or forceps.
7. Mount larva on convenient sized twig. I use Hawthorn thorns.
8. Data label with date larva was killed and where found. In case of a larva bred from ovum, this would be where the imago was caught or the ovum found. In addition, full notes should always be kept on the life history and food plants of the larvae.

Most skins retain their true colours with the exception of green larvae where colour is often provided by their body contents. These skins tend to dry more yellow than when the larva was alive. With practice it is possible to preserve skins in the attitudes adopted by larvae when alive.

I never preserve any skin, unless I can certainly identify the species. Personally I find the larvae of many Noctuidae and Geometridae very difficult to identify from descriptions or plates in books so unless I have at least three larvae (two to rear to imago and one to preserve) I would not preserve a larva. I find my collection of skins, normally only one for each species, very useful to identify larvae found in the field, even if only to eliminate some "possibles".

Equipment required

Metal tin soldered to wire legs, methylated spirit lamp, blotting paper, round pencil, selection of glass tubes with various sized ends, small syringe with rubber tube connection (as bellows).

I have set out the process I use to preserve larvae. Some may use springs to hold the skin on the tube or clips on the bellows etc. and there are accounts of methods in books. The final method selected is personal and a matter of trial and error but I hope these notes may be of use to someone trying for the first time.

P. A. Cordell (3656)

COLLECTING NOTES—MACROLEPIDOPTERA 1973 IN BURNLEY, LANCASHIRE

My collecting year does not really begin until June as not many Moths are about in the preceding months. The only species I have caught in March is the Pale Brindled Beauty, *Phigalia pilosaria* Schiff., and the month of April has only provided the occasional Garden Carpet, *Xanthorhoe fluctuata* L. May is slightly better for such species as the Common Wave, *Deilinia exanthemata* Scop., the Brimstone, *Opisthograptis luteolata* L., and the Garden Carpet. Other species which I found in May for the first time this year include the Flame Carpet, *Xanthorhoe designata* Kufn., the Water Carpet, *Lampropteryx suffumata* Schiff., and the Purple Bar, *Lyncometra ocellata* L. An interesting point is that all these early moths were caught during daytime and I have rarely seen any on the wing at night.

June began slowly with a Common Wave on the 1st and a Brimstone Moth on the 4th. At 10 p.m. on the 5th I set off with my sugaring mixture of syrup and beer for Heasandford Wood. It is only small and stretches for approximately half a mile and when I go right through the wood (twice per week) I sugar thirty-seven trees. These trees have been sugared consistently for three years and I keep a record of every moth on every tree. This evening I sugared seven trees and was rewarded with a Knot Grass, *Apatele rumicis* L. on the fifth tree. June 5th is quite an improvement for a moth at sugar, as last year I had to wait until the 23rd June for the first. The evening also provided another new species for the year, the Silver Ground Carpet, *Xanthorhoe montanata* Schiff., at Stinging Nettle.

A day later, two more new species appeared, the Ghost Swift, *Hepialus humuli* L., and the Flame Shoulder, *Ochropleura plecta* L. The Ghost Swift usually appears around this date and the males (as South notes) "may be seen in the evening, sometimes in numbers in grassy places, swaying themselves to and fro without making progress and appearing as though they dangled from the end of an invisible thread; the female flies straight, and, as a rule, in the direction of one or other of the pendulous males". The single Flame Shoulder was taken at light and is the first I have taken in June since 1970. Last year the moth did not appear until 13th July and in fact I only caught three all the year.

On the 8th I set off in blazing heat for Hagwood. This wood is beyond Heasandford and stretches for two miles and it is here that I do most of my daytime collecting. In the evening the Silver Ground Carpet was abundant amongst the nettles and low plants and the male Ghost Swift was met with at regular intervals resting on the underside of leaves at the ends of slender branches. The Common Wave was seen fluttering lazily about and there is always the possibility of a new species. Just before I reached the old mill ruins I disturbed a moth from its resting place in a clump of tall grass. After a tiring chase I succeeded in netting it and found it to be a Flame Carpet, the first I have ever caught in June.

On the 14th June, three more new species were taken. At 10 p.m., just as the darkness was taking over, a moth whizzed past and settled a few feet away at the tip of a grass stalk. It turned out to be a Map-winged Swift, *Hepialus fusconebulosa* de Geer. I then began sugaring and on the way back found two Knot Grass had begun to feed on the first tree. An hour later I took the first Rustic Shoulder-knot, *Apamea sordens* Hufn. By the time I arrived at the last tree something special had arrived there, a Peach Blossom, *Thyatira batis* L. This is the fourth in the five years and the earliest taken so far.

The 16th was hot and the afternoon provided a dozen Chimney Sweepers, *Odezia atrata* L., and scores of Silver Ground Carpet. As the evening wore on, rain set in and when I set off to look at the sugar at 11 p.m. it was pouring. Just as I approached Heasandford House the net came in very useful for the capture of an Angle Shades, *Phlogophora meticulosa* L., one of the greenish form.

The sugar provided twelve moths and four different species, three new ones for the year. On arriving at the third tree I observed a Dusky Brocade, *Apamea remissa* Hubn., clinging on despite the pelting rain. The next tree was devoid of sugar but a solitary Knot Grass remained, to be swept off by the wind and water. The fifth tree was more sheltered and a foot from the bottom a Clouded-bordered Brindle, *Apamea crenata* Hufn., was feasting on the large bubbles of syrup trickled down from the main patch. On the next patch were four Knot-grass and a Marbled Minor, *Procus strigilis* Clerck, bringing the total in June to date to 14 species. On the 17th I did a tour of the "gaslamps" of the area. At the first lamp in Ferndale Street I saw a large moth which when disturbed with the net fell to the pavement where I found it to be a male Poplar Hawk, *Laothoe populi* L. This was only the third I have caught, the two previous being in 1971. Further on I found a Rustic Shoulder-knot and a Brimstone. By the 18th Ghost Swifts and Map-winged Swifts were plentiful, the latter congregating in dozens, the rapid beat of their wings making a buzzing sound. Sugar was providing only the Silver Ground Carpet, an unusual visitor, and the Large Yellow Underwing, *Noctua pronuba* L. Light was more effective producing a Beautiful Golden Y, *Plusia pulchrina* Hubn. On a paling I found a Small Angle Shades, *Euplexia lucipara* L. and a Common Swift, *Hepialus lupulina* L. on a wall.

On sugar on the 21st June new species were the Clouded Brindle, *Apamea epomidion* Haw., Middle Barred Minor, *Procus fasciuncula* Haw. and the Tawny Marbled Minor, *P. latruncula* Schiff. Street lamps provided a Buff Ermine, *Spilosoma lutea* Hufn. and Plain Golden Y, *Plusia iota* L. which bounced continually off the glass as it rocketed around. A Small Dotted Buff, *Petilampa minima* Haw., sat on the dark side of the post out of the limelight. Suddenly a moth shot past my face and settled half way up the lamp. As my net touched it, it dropped into the net and I carefully lowered it to put the moth in a jar. I could not then identify it but at home found it

to be a new species for me, the Spectacle, *Unca triplasia* L. Another new species occurred on my next visit, the Bright-line Brown-eye, *Diataraxia oleracea* L., bringing the total for the month to 29 species. In the previous year I recorded only 14.

On the 22nd the lamps were again rewarding with twenty moths of thirteen different species including my first ever White Ermine, *Spilosoma lubricipeda* L., the Mottled Rustic, *Caradrina morpheus* Jufn. and Grey Dagger, *Apatele psi* L. On the 23rd I returned to Heasandford Wood to sugar and added Sherry to the mixture, treating 26 trees. The evening produced twelve species which included the Crescent Striped, *Apamea oblonga* Haw., and a pair of the Dot Moth, *Melanchra persicaria* L. on a Birch tree, and the Small Angle Shades. At light I took a Garden Carpet and a specimen of the Beautiful Golden-Y, unlike any I have taken before—it is a startling rich golden colour with markings edged with gold. The fore-wings are mottled in the usual way with dark purple but the remainder instead of being light purple is pink. The head collar and thorax are a luscious pink which also edges the forewings.

On the 26th the Marbled Minor was very common at sugar, up to 28 on one tree. This moth is one of the few moths that tramples all over the mixture and they appear to fight as they scurry about bumping into each other. I have seen on occasions a foot long by two inch wide patch of sugar completely covered by the moth. Often they will push off such large species as the Dark Arches, *Apamea monglypha* Hufn. by sheer weight of numbers. On the same evening I took the first Gothic, *Naenia typica* L., of the year. It is an unpredictable moth—in 1971 I took twelve but only one in 1972 (in August). I increased my total of different species with a Small Clouded Brindle, *Apamea unanimis* Hubn., and the True Lover's Knot, *Lycophotia varia* de Vill., the latter at light. Also at the street lights I saw a large moth flying around and suddenly it dipped to hit the pavement. I got my net over it just as it started to fly off and found it to be the Swallow Prominent, *Pheosia tremula* Clerck.

June ended with the following species on the 30th, an Ingrailed Clay, *Diarsia mendica* Feb., at sugar, my first in June, a Peppered Moth, *Biston betularia* L., at light and a Burnished Brass, *Plusia chrysitis* L., by some stinging nettles. With the net I also took a Snout, *Hypena proboscidalis* L., and a Bordered White, *Bupalus piniaria* L. This year's June has brought a total of forty-nine species as against only fourteen in 1972 and twenty-eight in 1971. Twenty-four species occurred at sugar and thirty-two at light whereas in 1972 the respective numbers were only six and two.

Graham Rushton (5130)

PRACTICAL SUGARING

Before making a sugaring mixture you have first of all to provide yourself with a suitable receptacle from which to apply it, so I will describe the type I have used for many years.

You will require two 2 lb. syrup tins, and it is important that you get two, so that when one is nearly used up, you have another one to go at, leaving the first one to be topped up at your leisure.

To prepare a tin make a neat $\frac{1}{2}$ " hole in the centre of lid. You will then need half an inch of $\frac{1}{2}$ " brass or copper tubing (a $\frac{1}{2}$ " brass nut is admirable) for a ferrule. This requires soldering on the outside of the lid round the hole. Now procure a $\frac{3}{4}$ " paint brush. Pare the handle carefully so that on inserting it into the ferrule, it jams when the brush is about one inch from the bottom of the tin.

Now for the sugaring mixture; you can forget all you have read in the past about the fancy messy time-wasting concoctions, redolent of medieval alchemy and witches cauldrons, and go out and buy half a dozen 1 lb. tins of Fowlers West India Treacle. Warm three on top of the stove and divide the contents between the two tins. To each, add a small glass of wine, a dessert spoon of surgical spirit and lastly a few drops of amyl acetate. Hold the lid on and give a good shake. I generally use sherry as the wine, not Bristol Cream which I buy for myself, but a Cyprus sherry I keep for visitors.

Now for its efficacy.—From 1927 to 1950 I had a fair sized garden abutting the Doncaster Racecourse. It was an entomological gold mine and during the time I was there I registered 219 different species of moths. Sugaring in the garden was great fun and enabled me to augment my collection by some hundreds of moths, including a fine series of Yorkshire's great rarity, the Red Underwing, *Catocala nupta* L., only once previously recorded in 1876. At odd times I left the anointing process a bit late, but the moths were waiting for me as I went into the garden, flying round my head, settling on the trees as I was painting them, some even settling on the brush. What more do you want?

The sugaring mixture I have described has amply justified its attractiveness and the two tins I have used for over 20 years look good for another like period, and as a matter of interest, the brushes which have been immersed in the mixture all that time have suffered no ill effects. A final word of warning, never use the brush to lever off the lid, it will soon part company; use a coin.

L. G. F. Waddington (169)

THE BEDSTRAW HAWK, *Celerio galii* ROTT.

I have records of four *Celerio galii* being caught in July 1973 including one on the Ocean Weather Ship "Weather Monitor" stationed some 400 miles west of Scotland and 200 south of Iceland. I understand that other specimens of this immigrant Hawkmoth have been caught and would welcome details of date, time and place of any captures.

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AN EXPEDITION TO GREECE—MAY 1973

All my previous trips abroad have been in the months of June and July when in the mountains the peak emergences of insects occur. However in the south of Europe there is an early Spring emergence which includes many species which do not produce a second generation so that to observe these it is necessary to have an early holiday. This is particularly true of Greece where the Spring butterflies are on the wing in April and early May. Having read many exciting accounts of Greece in the Spring from the pens of Mr. R. F. Bretherton and Dr. C. de Worms and having received very helpful advice from them both, W. L. Coleridge and I decided to go and see for ourselves. Because of domestic difficulties we had to fix the two weeks at the beginning of May though we feared that this might be too late for the majority of species and too early for the special species of the mountains. So on the 30th April, loaded with impedimenta to the official limit and with minimal attire, we flew off from Gatwick by DanAir Comet at 10 a.m. across the snow-covered Alps then down the length of Italy past Etna, brilliant in the sun, to land at the airport just south of Athens at Gifladia. The time was 2.20 p.m. which immediately became 3.20 p.m. by local time. A Volkswagen 1300 was waiting for us and we drove off past the Acropolis and through Omonia Square to the north of Athens. The traffic in Athens is frightening even to one used to driving in London—we were glad to reach the road leading towards Lamia. This eventually joined the Toll Road and after a dusty drive with the temperature in the eighties we reached the junction signposted to Delphi. Signs are in Roman and Greek letters. We drove by the town of Thivai (Thebes) and, towards Levadia, came out of the plain into the mountains. Here it was cooler but



the road became more twisty and speeds reduced. We reached our highest point near the village of Arachova, famous for its woollen rugs, and then descended by a dusty grit covered road towards Delphi. This was to be our headquarters for the first week and we arrived to find the village bursting at the seams with people—it was the day after the Greek Orthodox Easter and everyone was on holiday. We eventually found a spot to park the car and walked back into the village to our hotel, the Hermes. Here we had a very pleasant room with shower, overlooking the valley of the Castalian stream, now a small trickle running down to the Sacred Plain and the Port of Itea. As we had dinner in the adjoining hotel we were disturbed by a huge locust which flew in through the open doors. Moths and bats flew along the lighted streets and as we walked back to bed we observed several moths on the walls and in the shop windows, the shops staying open until nearly mid-night. Among the species observed were a handsome Tiger moth, and the Lunar Double Stripe, *Minucia lunaris* D. & S. It was extremely hot all night, the room temperature being over 70°F.

On the Tuesday morning, 1st May, we made our first sortie, driving down just below the village and parking beside the Castalian Spring where those who consulted the oracle in ancient times purified themselves. The water which gushes out of a pipe in the rock is very sweet and thousands of honey bees drank from the overflow that ran down the road. Above the road were several bee hives and we carefully skirted these and climbed out on to the slopes below the Phaedriades, twin cliffs from which Aesop was thrown to his death. The slopes were rock strewn but goat tracks made it possible to move about fairly easily and everywhere among the stones were flowers. In the hot morning sun the slope at 9 a.m. was already alive with butterflies and we scrambled about in pursuit. It was quite a dangerous exercise as Coleridge fell quite heavily twice and I started a rock fall, one of which landed on my toe causing me to limp for the rest of the trip. Among the Whites which were our main interest we found *Pieris kreuperi* Stdgr., freshly emerged in both sexes and I observed a female laying her eggs on the leaves of *Alyssum montanum*. There were dozens of slower flying *P. ergane* Geyer which were joined by odd specimens of *P. mannii* Mayer and *P. rapae* L. The main flower attractant was Red Valerian, *Kentranthus ruber* L., and by sitting beside a clump of this it was possible to net specimens without the hazards of the chase. I took *Anthocaris gruneri* H.-S., a small and delicate Orange Tip and the faster flying *A. damone* Bdv. in this way. The latter butterfly I only observed here and took 1 male and three females. It is very like *A. belia euphenoides* Stdgr., heavily suffused with yellow and a brilliant butterfly on the wing. Also flying fast were a lot of *Euchloe ausonia* Hbn., some of the females of which were also very yellow on the underside. Other Pierids were *P. brassicae*, *Colias crocea* Geoff. and several Brimstones which probably included all three species, *G. rhamni* L., *G. cleopatra* L. and *G. farinosa* Zell., but all were in rags and we were obviously too late for the hibernated butterflies and too early for the new

emergence. I disturbed a huge Tortoise and several snakes which were small and sandy coloured and could have been vipers. Frequent visitors to the Valerian were all three species of Swallowtail, *Papilio machaon* L. *P. alexanor* Esp. and *Ipheclides podalirius* L. *P. alexanor* became very abundant during our stay here but always difficult to net. In the morning they settled very seldom, hawking up and down the slopes and gullies and, posted in one of these flight lines, I was able to net a few. The full heat of the day brought them more frequently to the Valerian but at this time of the day the majority of other butterflies had disappeared, to rest among the olive groves or in the shade of rocks and bushes. The heat became intense by 2 p.m. and I joined the insects in the shade of the *Cupressus sempervirens* which grew in a clump on the slope, spiking their narrow columns to the steely sky. Later in the afternoon we went down to near the road where I captured a new species, the black Skipper *Erynnis marloyi* Bdv., a male and a female. Coleridge returned to the hotel and I went back through the village to the rough meadows below the new road where there were a lot of donkeys and mules tethered, still with their heavy saddle packs on. The terraced slopes were roughly grazed and covered here and there with clumps of scrub. I took quite a few butterflies among the flowers including *Plebicula thersites* Cant., *Aricia agestis calida* Bellier, *Philotes baton schiffermuelleri* Hemming which was very common, and the Skipper, *Spialia sertorius orbifer* Hubn. I observed a female *A. gruneri* laying on the flower heads of the same Alyssum that I had seen *P. kreuperi* making use of the leaves earlier that day. The only Satyrid was our own Wall, *L. megaera* L. which was a large bright form.

On Wednesday morning we decided to try the high slopes around Mt. Parnassus to see whether any of the high altitude species were yet about. We drove up to the village of Arachova and turning off into a small road at the start of the village we followed a winding rough track above the village. It was very bad but suddenly came onto a very fine tarmac road as we reached the high meadows. These looked as though the snow had not long left them and against the background of the snow-topped mountains we wandered across the rock strewn grass which was studded with Grape Hyacinths and dwarf Iris, *I. chamaeiris*. The only butterflies seen were the Common Blue, *Polyommatus icarus* Rott. and *Aricia allous montensis* Vty.

It was obvious that we were much too early for anything here and although we drove on into the massif and explored other spots the only other species seen were migrating Bath Whites, *Pontia daplidice* L. We drove back down to just above Arachova and explored the stone strewn slopes and immediately I disturbed a butterfly which looked like a large Wall butterfly. I eventually caught up with it and got a net over it. It turned out to be a fine specimen of *Zerynthia polyxena* Schiff. of a form in which the ground colour was more brown than yellow. Subsequently we captured several, all the females of which were of this form, the males being typical. I

failed to find its food plant in the area, *Aristolochia* spp. though the whole slope was thick with a Periwinkle, *Vinca herbacea*, with bright gentian flowers. Other species seen here included *P. krueperi*, *A. damone*, and *A. gruneri*. While we collected a vast herd of goats came down the slopes followed by a similar number of sheep. Considering the amount of grazing that takes place in the mountains they are much richer in insect fauna than the mountains of Durmitor where we had been in 1972. On the Thursday morning we returned to the slopes around the ruins and had a look over the Temple of Apollo, with its reconstructed Treasury of the Athenians and the fine amphitheatre immediately below the Phaedriades. There were Whites flying everywhere and a few Blues, including *Plebicula dorylas* Schiff. and *A. agestis*. There were crowds of visitors everywhere but we climbed up fairly high and spotted a few interesting birds. Blue Rock Thrushes were nesting in the cliff and I saw one with a huge locust in its beak. Rock Nuthatches were among the ruins and I found their little trilling song rather like that of the Wren. We saw a Levant Sparrow Hawk and a pair of Booted Eagles. The crowds made any serious collecting impossible and we spent our time looking at the ruins which included a large conical stone which was known as "The navel of the Earth"—Delphi's old title. On our return to the Hotel I phoned through to the village of Kalavryta on the south side of the Gulf of Corinth to book a room at the Hotel Maria there for the coming week.

Our next sortie, on Friday, was down through the olive groves to the Port of Itea to check on the Ferry and then back along the road to Amphissa, famous for its black olives. The road lead up from the town to the pass leading to Gravia. At the top we stopped near where there are Bauxite quarries and collected on the slopes and among some old workings. A small stream cut across the roadway to fall down the slopes and the whole area was rich in butterflies. We took most of those seen at Delphi and *A. gruneri* was particularly common. *Z. polyxena* was also common but of the normal colour form. The Skippers included both *E. tages* and *E. marloyi*, *Carcharodus alceae* Esp. and *C. lavatherae* Esp. and the commonest of the Blues was *Glaucopsyche alexis* Poda which was flying with *Cupido osiris* Meig. Several Holly Blues, *Celastrina argiolus* L., were also flying around the bushes. Most of the slopes have large thickets of a dwarf bush-like Oak, *Quercus coccifera*, which were in flower and myriads of beetles were flying around them and scrabbling in the pollen. I took a few fresh *P. napi* L. which appeared to be typical and there were a lot of fresh Orange Tips, *A. cardamines* L., all males. There was a continual stream of lorries coming over the pass as we drove back down to the plain. The olive groves had a smattering of butterflies but were poor compared with the slopes above. Saturday dawned the hottest yet. We had our breakfast on the balcony above the gorge and watched the flights of Alpine Swifts sweeping down from the crags. I spent the day on the slopes around the ruins and took two new species, the Speckled Wood, *Pararge aegeria* L. and *Melitaea trivia* Schiff. The latter were just emerging and were all males. Their food plant

Mullein (*Verbascum* sp.) was growing all over the slopes. Their flight and appearance on the wing was very similar to *M. cinxia* L. which were flying with them. After disturbing two snakes which looked like vipers I walked a little more circumspectly down towards the temple of Athene and the beautiful Tholos, a circular shrine with marble columns. Below were meadows among the ancient olives and I found clumps of wild *Gladiolus* among the grasses. There were a few butterflies resting in the shade of the trees and it was not until 4 p.m. that they started flying along the slopes again. We spent the evening after supper looking around the street lights and Coleridge spotted a huge moth which turned out to be a female *Saturnia pyri* L. She laid a few eggs before expiring and I have the larvae feeding, as I write, on Pear leaves. They are now huge green caterpillars with large blue hairy tubercles.

On the Sunday I went to the morning service in the Greek Orthodox Church in the village. The service started at 6.30 a.m. and I left for breakfast at 8.30 with the service about half way through. The sanctuary is almost totally screened from the congregation and chanting takes place throughout the service. The church was beautifully ornate with murals and ceiling paintings. After breakfast we drove down to the village below Delphi, Xrissa, where we collected along the dry slopes between Almond trees and rough meadows. *M. trivia* was abundant here and females were just emerging. I took the largest Black-veined White, *Aporia crataegi* L., I have ever seen and there were *P. alexanor* and a lot of *I. podalirius* flying among the trees. I walked through some rough undergrowth and was very badly stung by a bunch of Stinging Nettles which looked a little like Hops. They were *Urtica pilulifera* and I was in such a state that when we decided to drive lower down the slopes I left my net on the car roof. About half a mile down the road I realised what I had done and we drove straight back but it had gone. Fortunately I had my second net and we explored a few of the spots along the road down to Itea. The only new species seen was *Strymonidia spini* Schiff. We returned to Delphi and spent the rest of the day climbing up and examining the Stadium which is a 200 yard long track about 30 yards wide with terraced stone seating on one side, sited in the Pine woods above the village. Several *Polygonia egea* Cr., the Southern Comma, was flying about along the walls of the Stadium and quite a few *M. trivia* on the slopes around. It was very hot and we made an early finish to pack for our trip across the Gulf in the morning.

(To be concluded)

P. W. Cribb (2270)

LETTERS TO THE EDITOR

The Feeding Habits of Adult Butterflies

I was interested in Mr. Stallwood's series in the Bulletin on this subject published in Vols. 31 and 32, especially in regard to *Melitaea cinxia* L. In the coastal habitats in the Isle of Wight there is a lot of Sea Thrift, *Armeria maritima* (Pers.) Schult, and I have frequently seen the butterfly attracted to

its flowers. On one occasion I watched a dozen or more flying around a large patch of Thrift and settling upon the pink flowers, a lovely sight. H. Goss recorded a number of plants to which *M. cinxia* was attracted (vide Barrett, British Lepidoptera Vol. 1, 1893). The flowers he mentions are *Lotus corniculatus* L., *Anthyllis vulneraria* L., *Hippocrepis comosa* L., *Ononis repens* L., *Ranunculus* sp. and *Hieracium* sp. In inland localities he records *Euphorbia amygdaloides* L. and *Cruciata laevipes* Opiz.

T. D. Fearnough (3966)

Following the interesting articles by Mr. B. R. Stallwood on the above subject, you may be interested in my observations during the summer of 1973. Feeding on Hemp Agrimony, *Eupatorium cannabinum* L., were seen Peacocks, Small Tortoiseshells, Small Coppers, Common Blues and Silver Washed Fritillaries. On *Buddleia davidii* Franch. were Silver Washed Fritillaries, Peacocks, Small Tortoiseshells, Red Admirals, Painted Ladies, Large, Small and Green-veined Whites. Garden Heliotrope was rewarding with Purple Hairstreak, Speckled Wood, Meadow Brown, Red Admiral, Green-veined White and Silver Washed Fritillary. Undoubtedly Knapweed, *Centaurea nigra* L., and the Ice Plant, *Sedum spectabile*, were favourites. On the former were Brimstone, Silver Washed, Peacock, Small Tortoiseshell, Small Copper, Large and Small Whites, Green-veined White, Speckled Wood, Hedge Brown, Meadow Brown, Red Admiral, Wall Brown and Small Skipper. By accident we discovered that our geese provided a wonderful management tool. In their large area of grass they kept the grass short by grazing which allowed the most luxuriant growth of wild flowers imaginable. Knapweed predominated but good displays were made by Purple Loosestrife, *Lythrum salicaria* L., Fleabane, *Pulicaria dysenterica* (L.) Bernh., and Meadow Sweet, *Filipendula ulmaria* (L.) Maxim. In a relatively small area of about 200 square yards one could commonly see as many as four or five Silver Washed Fritillaries at any one time.

However, the record must go to the Ice Plant where on the 9th September I counted (as best I could) 550 butterflies and 19 Silver Y moths on a 45-yard long row. The total was made up of Small Tortoiseshells (515), Peacocks (4), Red Admirals (17), Small Copper (1), Speckled Wood (1), Large White (1), Small Whites (10) and Green-veined White (1). On other occasions Painted Ladies, Wall Browns, Silver Washed, Common Blues and Purple Hairstreaks have been observed feeding on the same row.

Perhaps my strangest observation this year concerned our runner beans where on several occasions I saw a Brimstone butterfly feeding on the flowers. Large Whites seem to have the same taste. It only goes to show what folly it is to splash insecticides around the garden—even in the vegetable patch.

J. S. Butter

Cowley Wood Conservation Centre, North Devon

INTRODUCTION TO CRANEFLIES—PART VI

False Tigers and Limonia's

Craneflies with R_2 and 3 unbranched and/or vein R_1 curving down to $R_2 + 3$.

There are only two groups of craneflies with wing vein $R_2 + 3$ unbranched (see fig. 1C) so the nature of this vein is one of the first characters to determine. The wing venation of representative members of the two groups are illustrated (fig. 4). Note that *Phalacrocer* is the only species here with $R_2 + 3$ branched, and is distinct from genera in other groups with a very short upright R_2 vein in having R_1 curving down into $R_2 + 3$. The Tipulid groups concerned are the sub-family Cylindrotominae and the tribe Limoniini of the sub-family Limoniinae.

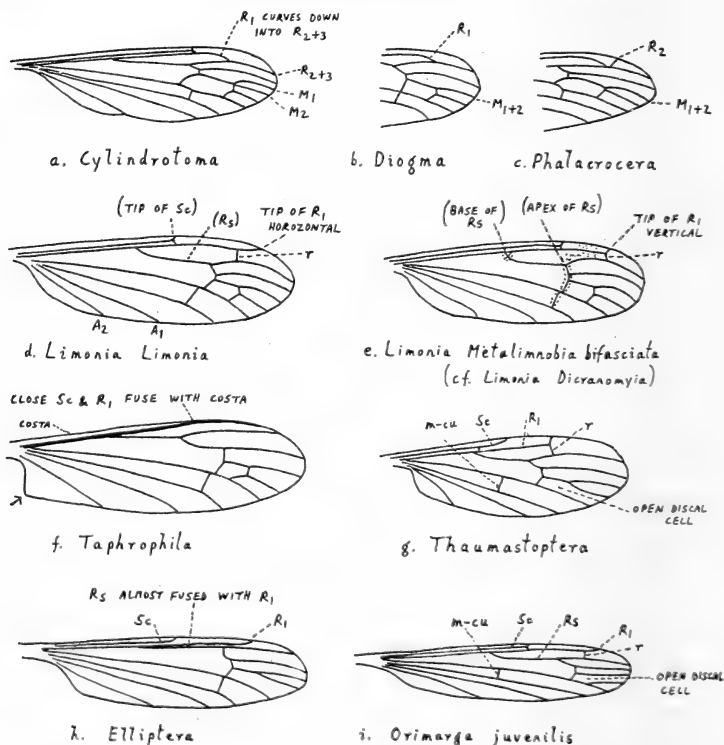


Fig. 4.

Fig. 4. Wings of Craneflies with $R_2 + 3$ simple or R_1 curving down into $R_2 + 3$. Cylindrotominae a-c, Limoniinae Limoniini d-i.

Sub-family *Cylindrotominae* False Tigers.

There are only four British species, all medium sized and characterised by the way R_1 curves down to meet $R_2 + 3$ (fig. 4 a-c). They have a rather distinctive appearance, in particular the abdomen looking long and thin. The major feature of the sub-family is found in the specialised larvae; three species live in moss and have peculiar projections on the body and one (*Cylindrotoma*) has a legless caterpillar like larvae which feeds on the leaves of herbaceous plants.

Yellow False Tigers. Two species have yellowish bodies with three deep black stripes (sometimes partially fused) on top of the thorax. The only other craneflies with this distinctive pattern are the true Tigers, *Nephrotoma*, which are Tipulinae with $R_2 + 3$ branched. *Cylindrotoma distinctissima* Mg., with cell M_1 present, is fairly common in May and June and again in the autumn in damp woods. *Diogma glabrata* Mg., which lacks cell M_1 , is less frequently seen and is out in July and early August.

Brown False Tigers. These lack the tiger pattern and are drab brown or dark grey brown species of local occurrence by mossy pools and on bogs. *Phalacrocerca replicata* L. has R_2 present and *Triogma trisulcata* Schum. lacks R_2 and has the surface of the head and thorax deeply pitted (the latter character is not found in any other British Craneflies).

Sub-family *Limoniinae*.

Tribe *Limoniini*. Of the 3 tribes, this is the only one with $R_2 + 3$ unbranched. Members of this tribe are on the wing from April to November and include some of the most abundant and widespread Tipulids. They are mostly medium sized, but include a few small species. Some species have distinctive patterns on the wings, either mottling or spots.

For present purposes the Tribe may be divided into a number of major groupings. One very useful character is the nature of the end of vein R_1 in relation to cross vein r ; the tip of R_1 may be long and horizontal (fig. 4d) or short and vertical (fig. 4e). Most of the genera contain only a few, and often scarce, species, so most specimens will run to the large genus *Limonia*—within the genus the most frequently met sub-genera are *Limonia*, *Dicranomyia* and *Rhipidia*.

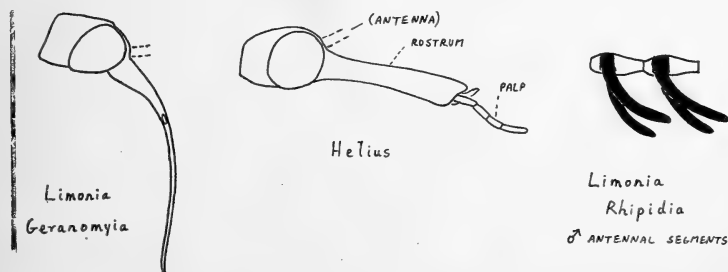


Fig. 5. *Limoniinae* *Limoniini*. Special characters of head and antennae of *Limonia* (*Geranomyia*), *L. (Rhipidia)* and *Helius*.

The following key includes the genera and sub-genera of Limoniini. This type of key is frequently used in some biological groups, but is rarely used with insects. Since a tabulated key has advantages over a dichotomous one, this experimental version is given to see if amateur entomologists find it easier to follow. Choose the high order description which fits your specimen and move to successively lower order descriptions.

Wing venation typical (discal cell and *r* present [vein Sc and Rs clearly separated]).

Special features.

Long proboscis blunt tipped	<i>Helius</i>
pointed	<i>Limonia</i> (<i>Geranomomyia</i>)
Pectinate antennae (wings mottled or with spots)	<i>Limonia</i> (<i>Rhipidia</i>)
Ring like markings on wing and cross vein between A ₁ and A ₂	<i>Limonia</i> (<i>Discobola</i>)
Praescutum shining black and wings clear	<i>Limonia</i> (<i>Melanolimonia</i>)
Above special features lacking.	
Tip of R ₁ long and horizontal	<i>Limonia</i> (<i>Limonia</i>)
Tip of R ₁ short and vertical	
Sc ending nearly opposite base of Rs	<i>Limonia</i> (<i>Dicranomyia</i>)
Sc extending well beyond base of Rs	
Wings with or without distinct spots	<i>Limonia</i> (<i>Dicranomyia</i>)
Wings either yellow with a black bar or with brownish mottling and spots	<i>Limonia</i> (<i>Metalimnobia</i>)
Wing venation atypical	
Discal cell absent.	
<i>r</i> present	
Tip of R ₁ short and vertical	
m-cu near centre of wing (small pale yellow species)	<i>Thaumastoptera</i>
m-cu nearer wing margin	<i>Limonia</i> (<i>Dicranomyia</i>)
Tip of R ₁ long and horizontal	<i>Orimarga</i>
<i>r</i> absent, Rs almost fused with R ₁	<i>Elliptera</i>
Discal cell present.	
Sc fused with R ₁ , <i>r</i> absent	<i>Taphrophila</i>

genus *Thaumastoptera* Lemon Limonia

The single species in the genus is very distinctive in its small size, the pale greenish lemon coloured body (when alive) and the black tips to the femora and tibia. Superficially it resembles the small pale yellow *Cheilotrichia imbuta* (tribe Eriopterini) which has a very different wing venation. *Thaumastoptera calceata* Mik is a local species of marshy woods.

genus *Taphrophila* Milky-winged Limonia

The milky coloured wings and distinctive wing venation of this pale brown bodied crane fly makes the single species, *T. vitripennis* Mg., simple

to identify. It may be locally found on the banks of large streams and rivers, but sometimes strays from the breeding site.

genus *Orimarga*

The two poorly known British species are found by streams in western and northern districts. In *O. virgo* Zett. the horizontal tip of R_1 is 2 to 4 times as long as r (i.e. from the junction of R_1 and r) whereas in *O. juvenilis* Walk the tip of the R_1 is less than twice as long as r .

genus *Elliptera*

The adult of the single species, *E. omissa* Egg., has never been found in Britain, but the empty pupal skins were found projecting from a log partly submerged in a waterfall in Yorkshire.

genus *Helius*

Pond Snouts

There are three species which may be found among vegetation by ponds, canals and sluggish rivers. *H. flavus* is yellowish and without a stigma, *H. longirostris* is brown with a pale stigma and *H. pallirostris* is a local dark brownish species with a dark oval stigma.

genus *Limonia*

Limonias

sub-genus *Geranomyia*

Sea Snouts

The two British species are confined to the sea shore, *G. unicolor* Hal. occurs on rocky coasts (and lacks stripes on praescutum) whilst *G. bezzii* Alex. lives in sheltered lagoons with shingle shores in Dorset (and has stripes on the praescutum).

sub-genus *Rhipidia*

Feathered Limonias

Limonia (*R.*) *duplicata* Doane is one of the commonest Limonias of woods and hedgerows—the profuse diffuse spots on the wings give a mottled appearance and the pectinate antennae (most marked in the male) are not so clearly marked in any British Craneflies except the large *Ctenophora* species (Tipulinae). The other two British species, *L. (R.) ctenophora* Lw. and *L. (R.) uniseriata* Schum., are rare species which breed in rotten wood and only have a few spots on the wings.

sub-genus *Melanolimonia*

Black Limonias

Of the five small British species with a shining black praescutum and clear wings, only one is widespread in the south, *L. (M.) morio* F., the other species being local in northern and western districts. It should be noted that two rare medium sized species, *Limonia (Limonia) maculipennis* Mg., and *L. (Dicranomyia) consimilis*, also have a shining black thorax, but they have mottled or spotted wings.

sub-genus *Discobola*

Eyed Limonia

The only two British specimens have been taken in Scotland, both *L. (D.) annulata* L., but a further species could occur. The eye like ring markings on the wing are not found in any other crane fly except *Epiphragma occellaris* (tribe Hexatomini) which has $R_2 + 3$ forked and lacks the cross vein between A_1 and A_2 .

sub-genus *Limonia*

True Limonias

These are medium sized species including some of the commonest craneflies in Britain. They may be divided into two major groups depending on whether the wings are mottled or not.

There are four mottle winged species. *L. (L.) nubeculosa* is unmistakable in having three dark rings on the femora—a very abundant species in woods, whilst *L. (L.) flavipes* F. only has one ring on the femora at the tip and is common in early summer particularly in woods on calcareous soils. The other two species are not often found—*L. (L.) dilutior* Edw. has two rings on the femora and occurs on heathland among gorse and broom and *L. (L.) maculipennis* has a shining black praescutum.

Six species have only a few spots on the wings or lack spots. Three species are yellow, of which *L. (L.) tripunctata* is the commonest (out mostly in May and June) with three small spots on each wing, *L. (L.) trivittata* has three stripes on top of the thorax and occurs in wet woods and *L. (L.) stigma* Mg. is a rare species with a yellow head and lacks the characters of the other two. The local species *L. (L.) nigropunctata* Schum. has an orange thorax and black abdomen, whilst the rarity *L. (L.) masoni* Edw. has an all black body. The remaining species *L. (L.) macrostigma* Schum. is left till last since its ease of recognition lies in its lack of conspicuous features; it is drab brown in colour with a dark ring just before the tip of the femora and is often common in wet woods.

sub-genus *Metalimnobia*

Giant Limonias

There is no simple distinctive character which will separate the three species from the sub-genus *Dicranomyia*. However, all three are very distinctive and are generally over 11 mm in wing length whereas 10 mm is normally the maximum for *Dicranomyia*. The larvae all live in fungi, though some *Dicranomyia* have similar habits.

L. (M.) bifaciata Schr. is a large yellow species having broad yellow wings with a narrow black band across the wing (at a level with the back of the discal cell)—there is no other British cranefly like this. The remaining two species are brown with strongly mottled wings—a wing pattern which is not found in any *Dicranomyia*. *L. (M.) quadrimaculata* L. is a rare species of ancient forest (two dark rings on femora) while *L. (M.) quadrinotata* Mg. is quite common in woods (one dark ring on femora, and closely resembling *L. (L.) flavipes*).

sub-genus *Dicranomyia*

Dicranomyias

This sub-genus contains a wide variety of very different looking species and indeed a few have been placed in other sub-genera which are not considered here. Some very common species belong to this group.

Ten species have spots or dark patches on the wings (in addition to a dark stigma). Two with silvery frons (area on face between eyes) are sometimes common around rotten logs—*L. (D.) decem-maculata* Lw. is blackish with roughly ten wing spots (five on each wing) and *L. (D.)*

dumetorum Mg. with two spots on each wing has a yellow thorax with a dark stripe along the side (see *inusta* later). Two species occurring in marshes and wet woods have a dark tip to the wing and two or three spots on the fore margin; *L. (D.) lucida* de Meig. is locally common in mid summer and has an orange thorax whilst *L. (D.) ornata* Mg. is found on butterbur in the spring and has a black thorax. *L. (D.) didyma* Mg. is a dark species with five spots running along the foremargin to tip of the wing and breeds in wet moss on waterfalls and by stream banks and *L. (D.) consimilis* Zett. is rather similar but with a shining blackish thorax—this is a Scottish rarity. One species is confined to sea cliffs and has many spots on the wings, especially a row of minute ones along vein Cu (forming the lower edge of the lower basal cell)—*L. (D.) goritiensis* Mik. Another species is a familiar sight in summer evenings since it is frequently the one which composes dancing swarms of craneflies similar to those of winter gnats—*L. (D.) chorea* Mg. which has a spot at the apex of Rs and a drab yellowish or pale brown body. Some varieties of *L. (D.) mitis* Mg. are closely similar, but are confined to streams (true *mitis*) or have a dark thorax with shining central stripe (form *affinis* Sch. of heathland and moorland) or are entirely yellow. The *chorea* (form *lutea* Mg.) *mitis* group is a difficult one for the beginner to separate.

Four species have an open discal cell, but all are rarities or confined to the north. The first two have the last antennal segments elongate—*L. (D.) ventralis* Schum. is found around ponds by the sea (only 2 segments to the palpi) and *L. (D.) ommissinervis* de Meij. is found on river banks (4 segments to palpi). *L. (D.) aperta* Wahl. is a locally common brownish species in the north in late summer whilst *L. (D.) aquosa* Ver. is blackish with a dark stigma and is found by mossy waterfalls and gorges in the north and west.

The remaining species have a closed discal cell and lack wing markings except that the stigma may or may not be dark. *L. (D.) inusta* is distinctive in having yellowish pleurae with a dark stripe (as in *dumetorum*). *L. (D.) fusca* Mg., a black species with hairy wing membrane, occurs by shaded streams. In woodland and hedgerows two brownish orange species are at times common through most of the season, *L. (D.) modesta* with the last antennal segments elongate and *L. (D.) autumnalis* with these segments short. *L. (D.) sericata* Mg. is a spring species, usually on calcareous soils, which has an ash grey thorax with three blackish stripes on the praescutum. On boggy ground in mountain areas, *L. (D.) stigmatica* Mg. with its black stigma is locally frequent in late summer. Three species are found on coastal marshes—*L. (D.) sera* Walk. (pale brown and with basal antennal joint pale), *L. (D.) complicata* de Meij. (sides of thorax dark, base of legs (coxae) pale, stout dark species) and *L. (D.) danica* Kuntze (antennae entirely dark, and sides of thorax and coxae similar colour, male genitalia complex).

(to be continued)

Alan E. Stubbs

THE HYMENOPTERA ACULEATA

"At a guess, I should estimate that there are now less than a hundred Hymenopterists (apart from Bee-keepers) in our island, with probably a further three or four hundred students of other orders who take a keen interest in the group."

B. A. Cooper, 1943, "The Hymenopterist's Handbook"

This is the first of a series of articles which I hope will encourage more interest and work in the Aculeata. A great part of the problem I find is the lack of keys to the separate species and easily obtainable information on the majority of the insects. I hope to go some way to remedy this. Should there be enough interest in the enterprise, I hope it will be possible to start a Hymenoptera Aculeata group, with its own News-letter and possibly postal library, but more of that later. For the present should you be interested, please write to me with your interests and let me have any ideas for this series and the group. My address is: "Far Slipperyford", Oakworth, Keighley, Yorks.

BUMBLE BEES

Bumble Bees

With a group even so big and conspicuous as the Bumble and Cuckoo Bees there is still a problem of finding keys and information for use in identification. On no account should the bees be compared to pictures as there is great variation in coat colour. (For the perfect example see Yarrow 1959, page 174. The best method of identification is to study the Male Genital capsule, but this is outside the scope of most AES members). The three most used keys are Poole 1953, Yarrow 1959 and Alford 1973. I will consider the keys in turn.

(i) T. B. Poole, *Collecting Bumble Bees*, AES Leaflet no. 25, 28 pp. (available from Christie).

This is a useful little booklet and is well worth having. The key is mainly based on coat colour, and as such should be used with care. The diagrammatic pictures are useful, but too much confidence should not be placed in them.

(ii) Ian Yarrow in Free and Butler, *Bumble Bees*, Collins New Naturalist series, £1.50.

This key again is mainly concerned with coat colour, but is fairly good and has given me little trouble. The book itself is too bulky to be taken into the field, so it may be useful to duplicate the keys (or photostat them).

(iii) D. V. Alford, *Guide to British species*, Bee Research Association, 45p (post free), (available from the address on the Bulletin back cover):

This is probably the key which bridges the gap between a key for the amateur and a key for the professional. It uses both coat colour and rather more advanced characteristics such as the Male Genitalia. This booklet has the disadvantage of the keys to *Bombus* being in four parts (Parts III to VI). A key to these parts may be as below:

1. Bees with Tail red or orange; Thorax either entirely black or with collar or scutellum (or both) yellow or greyish.....(Part VI)
Tail any colour except red or orange (including pink). See 2 below.

2. Body colour more or less yellowish, reddish or blackish-brown as seen from above. Black hairs abundant on the thorax, but they never form a distinct band..... (Part III)
Medium to large Bees with the thorax either brown, yellow or yellowish brown on either the Scutellum or collar (or both) see 3 below.

3. Tail yellowish, brown or black, but never pink, red or orange. Females with spine on the basitarsus of the mid leg, males with long antennae. Both sexes with somewhat elongate heads (Part IV)
Tail White, pink or tawny, but never red or orange (care with faded specimens). Females without spine, males with reasonably long antennae (Part V)

I feel that this clarification should be a great help. Please write with criticisms.

Richard Hoyle (4886)

BUMBLE BEE DISTRIBUTION MAPS SCHEME

Progress Report: Spring 1973

By the end of 1972, the third year of the Scheme, we had 770 observers, 323 Recorders and 447 Collectors. Thanks to so much participation there has been good progress, in spite of the general scarcity of bumble bees in 1972. Records have so far been collated for 1328 10-km squares: 848 in England and Wales, 314 in Scotland and 166 in Ireland. The Biological Records Centre is at present using the data so far to hand for preparing maps of all 25 species, by means of a special typewriter automatically operated from punched cards. These will be made available as a "Preliminary Bumble Bee Atlas" from the Bee Research Association, Hill House, Chalfont St. Peter, Bucks., SL9 0NR.

Meanwhile the final part of Dr. D. V. Alford's "BDMS Guide to the British species" has appeared in the Entomologist's Gazette, and a 48-page reprint of the complete Guide has just been published by the Association.

The Natural Environment Research Council has provided a supplementary grant for the Scheme to continue in 1973, so please send in all the specimens and records you can. In England, parts of the Midlands and the stretch from N. W. Yorkshire down to Buckinghamshire and Oxfordshire are still poorly covered. Lincolnshire is the least well represented English county. The situation in Scotland is much improved since 1971. However, more records are needed from Wigtownshire, Dumfriesshire, Ayrshire, Lanarkshire, E. Ross-shire, E. Sutherland and Banffshire and, in Wales, from Carmarthenshire and Montgomeryshire. Records from the coastal areas of Ireland have been interesting, but there are very few data from the central plain.

We believe that many Museum collections exist, that are not yet in the Scheme, and ask especially for help in getting these into our records this year.

We will gladly send further Record Forms or Cards on request. The BDMS Guide can be obtained for 45p. A copy of the Preliminary Atlas can be ordered (for despatch when available) for 40p. Active participants in the Scheme will be entitled to receive a free copy of the section on bumble bees of the "Provisional Atlas of the Insects of the British Isles", edited by John Heath, from the Biological Records Centre, when it is issued later in the year.

ETHYL ACETATE AS A PRESERVATIVE

Some time ago I was pickling some British scorpion flies (*Mecoptera*) when I ran out of two of the orthodox preservatives, 70% alcohol and Pampel's fluid (2 volumes of glacial acetic acid, 15 vols. 95% alcohol, 6 vols. 40% formaldehyde and 30 vols. distilled water). The only other potential preservative I had at the time was the well-known killing agent, ethyl acetate. I placed several freshly-killed scorpion flies each into a small phial containing ethyl acetate. The tubes were then corked and stored away. Some months later I removed the specimens from storage to investigate them. To my surprise the ethyl acetate had evaporated as a result of capillary action between the glass wall of the phial and the cork. Although the insects had dried out, the bodies had maintained their natural shape and colours. On the other hand, the ones that had been pinned and set in the usual manner had the characteristic appearance of dried specimens in that the bodies had become discoloured and shrivelled.

Last summer I was studying some bush crickets (*Orthoptera: Tettigoniidae*) of the genus *Platycleis*, the males of which require the genitalia to be dissected in order to determine the species—assuming they have not been identified previously by their specific song rhythm. As I had not time to dissect the specimens as soon as they died, I placed them in one of three preservatives, namely, 70% alcohol, Pampel's fluid and ethyl acetate. Recently I have been setting and dissecting some of the insects. The ones that had been preserved in alcohol were soft and easy to dissect but difficult to set, owing to the fact that the joints of the limbs were stiff relative to the shafts. Also, on drying, these insects had a rather dull appearance. Specimens that were preserved in Pampel's fluid were most uncomfortable to handle as the substance induced the eyes to smart and made the nose and throat sore. They were also extremely difficult to set as they had become stiff. Pampel's fluid distorted the general colour quite noticeably by giving the specimens a rather transparent, pinkish look. However, the sclerotized parts of the genitalia (the titillators), that were used in identification of the species, could be removed from the surrounding material quite easily.

The individuals that had been kept in ethyl acetate were pliable and easy to set. On drying out, the natural browns and greys were unspoilt and very little distortion of the body was in evidence.

In conclusion: if an insect has to be dissected to enable sure identification it is best to pickle the specimen when the operation cannot be carried out on the fresh animal. After preservation in a fluid and identification by dissection, one may then wish to pin and set the animal for display in a cabinet. One may wish simply to preserve the natural shape and colours of the insect once it is dead. My own experience has revealed that ethyl acetate serves as an adequate preservative. It is cheaper to buy than alcohol, it is far less offensive to use than Pampel's fluid, it also renders the insect soft and pliable and thus easy to dissect and set. It is also conducive to the preservation of the natural colours and shape of some mecopterans and bush crickets.

Might it prove useful for the preservation of other insect groups too?

Michael J. Samways (4927)

Editor's Note: The late H. J. Cribb used ethyl acetate successfully for Coleoptera while collecting in France, using glass corked tubes.

OBTAINING OVA FROM BUTTERFLIES

Several entomologists, including myself at one time, find it difficult to obtain fertile ova of even the common species of butterflies. I tried to obtain ova from wild-caught *Lycaenids*, such as the Common Blue, *Polyommatus icarus* Rott. by placing them in large airy cages, with food-plant and flowers, but all they did was fly around the top of the cage, thus I obtained no ova.

I then thought of putting them in jam-jars in sunshine, and I obtained several ova of *P. icarus* on flower-heads of clover, before it got stuck onto the condensation on the side of the jar and died.

I then replaced the lid with netting, and this proved to be better. Ova are laid even in a cool place with no sunshine, but in a smaller amount. The food-plant should reach the top of the jar, so that the butterflies cannot help bumping into it. In this way, I successfully obtained fertile ova from wild-caught females of the Large Skipper, *Ochlodes venata* Brem. et Grey, Small Skipper, *Thymelicus sylvestris* Poda., Meadow Brown, *Maniola jurtina* L., Small Heath, *Coenonympha pamphilus* L., Wall Brown *Lasiommata megera* L. and Common Blue, *P. icarus*. I found thistles to be the best flowers for nourishing these butterflies. Small jam-jars were used with these species, but for larger species such as Nymphalids, larger jars are required.

P. D. Brock (4792J)

BOOKS RECEIVED

Butterflies of Georgia by Lucien Harris Jr. Published by Oklahoma Press (British Agents: Bailey Bros. & Swinfen Ltd. of Warner House, Folkestone). 326 pp. including 10 colour plates and 14 black and white photogravure plates. £4.00.

In 1797, John Abbott, an Englishman, published a two-volume study of the Butterflies of Georgia and many of the type localities for the southern USA butterflies are consequently in Georgia. Mr. Harris has brought Abbott's work up to date with this new book, reviewing all the butterflies known from the State, recalling many of the observations of Abbott and adding information and anecdotal observations which make the text a delight to read. Life histories and localities are listed and the plates illustrate all the species described. The colour plates are good, apart perhaps for those of the Hairstreaks, but unfortunately not to scale and no sizes are given. The black and white plates cover the Skippers and Satyrs. The book is a useful introduction to the butterflies of the Southern States and I found its content and style of a high standard and even to one who knew nothing of Georgian butterflies it made interesting reading.

PWC.

A Field Guide to the Insects of Britain and Northern Europe. by Michael Chinery. Published by Collins at £2.95. 352 pp. plus 60 colour plates by Brian Hargreaves, Gordon Riley and Denys Ovenden. Some 200 line drawings in text by Denys Ovenden.

This is in the best tradition of Collins' Field Guide series and fills a long standing gap in pocket literature on the insect fauna of the area. Any naturalist travelling on the Continent will find it invaluable and for the seeker after knowledge it will act as a first class introduction to the study of insects. The introductory chapters deal with the biology of insects, collecting and preserving and classification. A very useful key then places any insect in its Order. There then follows a chapter on each order and sub-order describing the constituent Families and some of their members occurring in the area. Fine colour plates further identify many of the species—the plates make the book worth buying.

Keys on some difficult families are included in the text and at the end there is a very full glossary and a useful bibliography, although I regret such omissions as the AES "Hymenopterist's Handbook". It is a book hard to fault but I found the method of interleaving the plates with the text annoying and feel these would have been better sited at the end of each chapter with which they dealt. The two plates of Lepidopterous larvae are obviously figures from blown specimens and I was sorry that so many British insects were figured, of which there are fairly easily obtained pictures, while the solely Continental material only gets a fair showing when our fauna lacks examples of the families or orders. However, Collins and Mr. Chinery are to be congratulated on this latest addition to their fast growing entomological library.

PWC.

Crickets and Grasshoppers of the British Isles by E. C. M. Haes. Published by the British Naturalists' Association at 15p. 15 pp. 18 b/w photographs of specimens in natural settings.

This pamphlet is reminiscent of the AES leaflet format and consists of an interesting introduction to the study of the Orthoptera and related Orders of Dictyoptera (Cockroaches) and Phasmida (Stick Insects) found in Britain. There follows a Field identification key which covers all these insects and gives a brief description of the adult, its song, months of appearance of adult, and habitat and distribution. This will make a very useful addition to the pocket on field trips or rambles and should enable many amateur entomologists to take a greater interest in this fascinating group. With more observations a better picture of distribution can be established. It is obtainable from A. Wootton of 13 Bishopstone Road, Stone, Nr. Aylesbury, BUCKS.

METHOD OF MOUNTING INSECTS ON STYRENE SQUARES

I believe that I may have a method of mounting insects, more specifically ants, flies and similar insects, which is new and not used by other collectors. It is a variation of mounting beetles on card, except that transparent styrene is used. This material is more convenient for observing the specimen under the microscope because it can be turned upside-down on the insect examination stage and the transparency of the styrene permits observation of the insect whereas cardboard cannot.

I start the mount by pinning the specimen on a very small pin, or if it is a fairly large fly, I use a number 9 pin. Then I cut a small rectangle of styrene and insert the pin into its centre, and push the styrene up against the legs of the specimen. Then I use a dissecting needle to tease the legs into a natural attitude from their folded position. Next I push the styrene against the ventral side of the insect and adjust the layout of the legs by pushing them around with the dissecting needle until I am satisfied with their configuration.

No glue or adhesive is necessary, and if desired, the styrene square can easily be removed after the legs have stiffened by gently easing the styrene from the bottom of the insect with a pair of forceps. Therefore, the styrene can act as part of the mount or simply as a support while the legs are setting.

The wings of the insects may be set by cutting triangular pieces of styrene and pinning these into position on the baseboard to hold the wings in place. These are removed after the wings are set and I am usually pleased with the result.

Kenneth W. Mardle (4668)

(A member of AES British Ants Study Group)

Note: Styrene may be obtained in rolls under the name of "Coverlon" from stationery shops or in sheets from modelmaking shops—or from some shirt boxes!

REARING TROPICAL PHASMIDS

This article is intended as a supplement to the A.E.S. booklet number 30, "Rearing Stick Insects", which only gives full details concerning the species *Carausius morosus* Brunner, *Bacillus gallicus* Charpentier and *Sipyloidea sipyilus* Westwood: the other tropical species are dealt with in only three pages. As I have reared some of the lesser-known types myself, the additional information may, perhaps, be of use to anyone wishing to have some insects a little out of the ordinary, but which, with only a minimal amount of effort, can be made to live quite contentedly in the home.

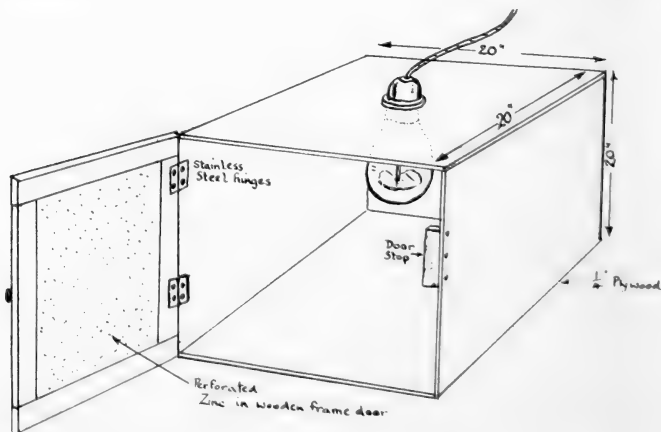
General Rearing Instructions

The rearing box which I use for all the following species is of very simple design: it is merely a wooden box made of five pieces of plywood nailed together, about 20 in. square, with a wooden-framed door at the front covered in perforated zinc, and a light-bulb holder screwed to the top. The bulb need only be of 25 watts for a cage of the dimensions I have indicated; for a smaller cage, a 10-watt bulb is quite sufficient.

All the articles for the construction of this cage can be bought at any hardware shop and none of the items is particularly expensive. When not in use for Phasmidae, the cage is perfectly suited to keeping tropical Saturniidae larvae or, without light-bulb, any British Lepidoptera its owner may choose to rear.

When opening the door of the cage, make sure that there are no insects along its edge, since legs can easily be pulled off if the door is opened too quickly. In fact, some species hang on so tightly that their feet must be "unhooked" before the door can be fully opened.

A thermometer is a useful addition to the equipment of one of these cages, because if the temperature drops below about 65°F the insects will not usually feed. In winter, a 40-watt bulb may be needed if the cage is kept in an unheated room.



One of the worst problems when rearing these species is, therefore, a power-cut, especially in winter. The insects can withstand a considerable drop in temperature for a few hours, but if they have no warmth for days they will almost certainly die. The best method of keeping the insects warm, I have found, is to fill a hot-water bottle with almost boiling water (heated on a gas cooker or on the fire), and to place it on the bottom of the cage. If this is done, say, every two hours, and a blanket wrapped around the cage so as not to let the heated air out, the insects can be kept warm enough for them to continue feeding.

The advantages of using a light-bulb, as opposed to some sort of aquarium heater, for warmth are twofold. Firstly, the heat is not too fierce, so that if an insect is close to the bulb, it is not burnt. Moreover, a bulb supplies light as well as heat, and since it is switched on for 24 hours per day, the feeding span of the nymphs is much increased, so ensuring that they grow more quickly than they would normally.

The above cage is ideally suited for holding Bramble, as sprays up to six feet in length can be accommodated inside it if they are coiled round a few times. However, for the Rhododendron- and Privet-eating species an old aquarium is a very useful container. It should measure about 18" x 12" x 12" and need not, of course, be waterproof. Such a cracked container may be bought from most aquarium shops for a reasonable amount, and should also, if possible, have a special hood, with two light sockets, to fit on top. Only one of these sockets need be used, because an aquarium of this type becomes very humid. A container such as this is ideal for species such as *Oxines macklotti* de Haan, which feeds on rhododendron.

Some aquarium hoods, however, take only fluorescent bulbs and these should, if possible, be avoided for three main reasons. Firstly, the tubes do not last as long as ordinary incandescent ones (which are guaranteed for 1,000 hours); secondly, they are very hot and scorch the foodplant; and thirdly, they are very expensive (60p for a 30-watt fluorescent bulb compared with 9p for a 25-watt incandescent one).

For an aquarium, a stick-on thermometer is the best type to use, and these can be bought for about 45p from any aquarium stores.

If a wooden cage is used, a high humidity cannot be maintained but the insects are quite content to be sprayed once a day, preferably at night, with cold water. Both the foodplant and the insects themselves should be thoroughly wetted, and the nymphs and adults can often be seen to suck up the droplets of water from the leaves and zinc door-covering. It is also important to plug the necks of the water jars in which the stems are standing with some sort of absorbent paper, even for those species which are much too large to drown in such a jar. This is because they can then suck the moisture out of the paper during the day, when the leaves have dried out. In addition, it is important to keep the jars topped up with water—Brambles are heavy drinkers!

Most of the tropical species are nocturnal. During the day, they rest motionless on the branches.

I keep the ova on damp, clean sand in clear, plastic sandwich boxes, which are airtight and parasite-proof. A sprinkle of Methyl hydroxybenzoate (Nipagen M) keeps down mould. The sand need only be sprayed lightly once a week, because the condensation inside the box keeps the air humid. By keeping ova warm, they can be made to hatch much sooner than they would normally, but even so, most ova take 3-4 months at least. For this reason, it is better to buy young nymphs than to wait for ova, which may be dessicated anyway, to hatch.

As long as it has water droplets to imbibe, a newly-hatched nymph can live for as long as a week without any food; however, it will die within a couple of days if no water is available.

Bramble can be gathered throughout the winter if a sheltered spot is found, but *Extatosoma tiaratum* and *Acrophylla titan* Macleay will also take Evergreen Oak (*Quercus ilex*) if a source is available. *O. macklotti* is no problem to feed during the winter because its natural foodplant is Rhododendron, which is evergreen in any case.

As a stick insect ages, it begins to lose its legs and claws, and to move more slowly. Often, it remains in this state for many months before it finally dies. Males are generally shorter lived and smaller than females, and usually have better developed wings than their partners. They also seem to be less common, and in *O. macklotti* there only appears to be one male to every five or six females.

All the species lay eggs in great profusion, simply dropping them to the cage bottom. *O. macklotti* however, will lay in a container of sand, pushing its abdomen about an inch below the surface, somewhat in the manner of a locust.

Every species of large Phasmid I have reared I have found very easy to keep. A general rule to go by is that if an insect looks strong and well-built it is hardy and easy to keep; but if it looks thin and delicate, then it is a little more difficult to rear.

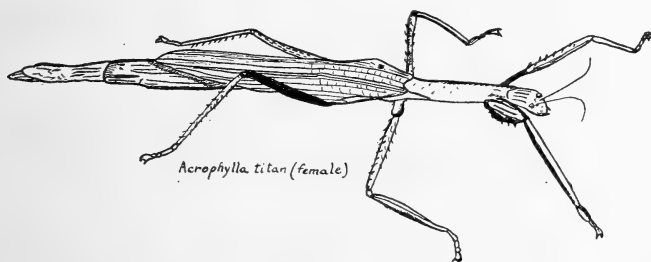
The four species which I am about to describe (plus *Eurynema goliath* Grey, which I have not reared myself) are all available in this country at the time of writing. If anyone would like ova of *Extatosoma tiaratum*, *Acrophylla titan* or *Sipyloidea sipyilus*, I shall be only too happy to give them away on receipt of a S.a.e. and a small plastic box, or other suitable container. My address is: 1 Ringwood Edge, Hullen Edge, Elland, Yorkshire. It must be remembered, however, that these three species cannot survive unless they have a heated cage.

Acrophylla titan. Macleay

Female: The body length is 6-7 in., and the total length, including front legs, 12-13 in. The legs, which are about 4 in. long (front legs 5 in.) are covered in small spines. The thorax is dotted with small green knobs. The antennae are 1½-2 in. long, curving downwards at the ends. The compound

eyes are quite large and there are three simple eyes in the middle of the head. The head is fawny-pink, the thorax this colour above and pink below and the abdomen fawn above and fawn with a black band at the rear of each segment, below. At the tip of the abdomen is a "chute" curled upwards at the end and about 1 in. long, from which the ova are ejected. The abdomen becomes very fat with eggs about a month after the final skin is shed. The wings, which are too small to allow the insect to fly, are mottled brown and white above and black and white below, with a patch of purple where they are joined to the body. The forewings are brown with a white band. The females of this species, like those of *Extatosoma tiaratum*, have an interesting defence reaction. When disturbed, or even when someone enters the room in which their cage is situated, the females "shoot" ova onto the cage bottom with great force. They do this by flicking the tip of the abdomen downwards, at the same time releasing the egg.

The female nymph is totally green and the wings can be seen to develop with each instar.



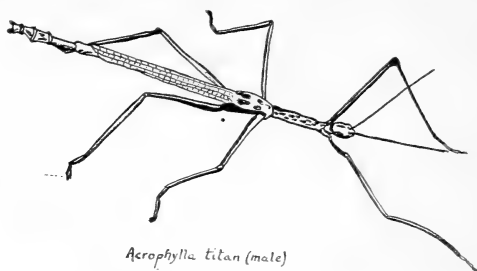
Male: As in most species of stick insect, the male *A. titan* is much smaller than the female, being only about 6 in. long, including legs. The legs are again covered in very small spines and are 3-4 in. long. The antennae are 2-2½ in. long, curving downwards towards the ends. For the size of the head, the eyes are extremely large and bulbous, and are a greenish colour. There are three compound eyes in the centre of the head. The upper side of the thorax, which is covered in spines, is a very dark green; the lower side is a bright orange, again covered with spines. The wings are fawn, with delicately pencilled black veins and are large enough to allow the insect to fly quite strongly. The wingspan is about 4 in.

The male nymph is brown, apart from a white stripe along the back. In all stages, the male is more slender than the female, whose legs are very thick in proportion to her body during the early instars.

Mating begins in the evening, but may last for from 24 to 48 hours. The ova are black and dotted with small holes. The operculum takes on a darker tinge as the ovum develops, being white for the first few months. Nymphs hatch after about six months.

Males are rarer than females, and die much sooner.

A. titan is indigenous to Australia, and eats Bramble or Evergreen Oak (*Quercus ilex*).



Acrophylla titan (male)

Clitumnus extradentatus Brunner.

Female: About 5 in. long, including legs. Antennae are very short—only about $\frac{1}{2}$ in. There are two distinct colour forms of the female: brown and green. However intermediate stages with patches of each colour also are found. There are two small, sharp “horns” on the back of the head, and spiny excrescences on the legs. Neither sex has wings.

Male: Slightly shorter than the female, and thinner. I have never bred a green male—all mine have been brown or fawn. The male is identical to the female in body-markings, etc.

The nymphs of both sexes are a greyish colour.

The ova, which are mottled black and grey, have a black operculum. They are dropped indiscriminately onto the bottom of the cage.

C. extradentatus Brunner takes readily to bramble.

Extatosoma tiaratum

Female: About 6 in. in length, including legs. The antennae are short and turned upwards slightly towards the ends. The back of the head is covered in spines as is the whole body. A double row of these runs from in front of the vestigial wings to the tip of the abdomen. The abdomen and legs have leaf-like extensions and are also covered in spines. Those underneath the abdomen can be raised at will, and can scratch badly when rubbed on the back of the hand. Apart from these spines, the body is very soft and silky; when full of eggs, it is also very fat, having a girth of $1\frac{1}{2}$ -2 in. The females can be quite vicious when disturbed; they stretch their back legs out straight at right angles to their bodies and, when anything approaches, close them like pincers. A particularly vicious one drew blood when I brought my finger too close to its legs. When they are disturbed the tip of the abdomen is curled over to touch the back of the head, in which position the insect resembles a huge scorpion. The body colour varies from light fawn, through reddish-brown, to almost black.

Male: The male is, as usual, smaller than and quite different from the female, being 5-6 in. long (including antennae), having leaf-like protruberances on its legs and abdomen. Its body is smooth, thin and dark-brown in colour. The large wings are mottled black and brown, with a 5-6 in. span. There are two spines at the back of the head and two more white spines at each side of the body, just in front of the last pair of legs. The eyes

*Extatosoma tiaratum* (female)

are very large and the three simple eyes in the middle of the head glow like gemstones when light is reflected from them. The male *E. tiaratum* is a very strong flier—I timed a particularly active specimen to fly around a light for 12 minutes on one occasion.

The nymphs can be sexed in the first or second instars, because the upper surface of the abdomen is smooth in the male and jagged in the female. In the later instars the male's wings can be seen to develop. When newly hatched, the nymphs look like huge black ants; they are very active and carry their abdomens curled upwards, a posture only assumed defensively in the mature female insect and not at all in the mature male.

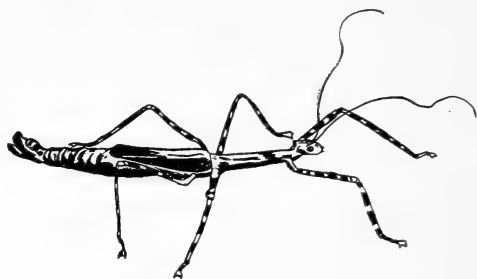
E. tiaratum lays the largest of any of the Phasmid ova. In shape, the ovum is like a hen's egg, except that there is a micropyle, like a little chimney, at the top. The surface is mottled brown and white, with a white stripe down each side, which contrasts vividly with the sombre colouring of the rest of the egg. The ova hatch in about six months.

This species is a native of Australia, where it eats Eucalyptus, but will feed on Bramble and Evergreen Oak in captivity.

*Extatosoma tiaratum* (male)

Orexines macklotti. de Haan.

Female: This species is smaller than the preceding ones, the female measuring about 4 in. in length, including antennae. The female of this species is, in my opinion, the most beautifully marked of all the Phasmids. Throughout its life it is a lichen mimic, having, in the adult stage, its legs banded with black and fawn and its body a mixture of black, brown, fawn and green. The underside of the body is black and fawn. The tops of the wings are of the same colour as the body but when flashed open are revealed to be orange bordered with black and white spots. They are however much too small for flight, having only about a one-inch span. When disturbed both the male and female flash open their wings and emit a strong, though not unpleasant, smell which clings to the hands.



Orsines macklotti (female)

Male: The male of this species is a very small and delicate creature, being only about 3 in. long, including the antennae which are very long in proportion to the body and curve downwards at the ends. The thorax and abdomen are orange and green, whilst the wings are orange as in the female, but with only a $\frac{3}{4}$ in. span.

Mating is very soon over. Males are again rarer than females, the preponderance of the latter to the former being about 5 to 1.

The young nymphs are banded fawn and brown, but even at this early stage in their development they are lichen mimics.

The ova are rather like those of *Sipyloidea sipylus* in shape but a little larger. They are not however stuck onto twigs but are pushed into sand, if provided, by the abdomen of the female: otherwise they are simply allowed to drop to the cage bottom. The surface of the bullet-shaped ovum has a rough texture and the micropyle is a flattened disc at the top, through which the nymph emerges after about six months.

As *O. macklotti* eats *Rhododendron*, it is one of the easiest species to keep through the winter. Moreover, *Rhododendron* leaves need only be changed every fortnight, whereas Bramble should be changed once a week at least.

Of the four species detailed above, the first and third have extremely large appetites, whereas the second and fourth eat comparatively little. A dozen *E. tiaratum* adults will completely devour a cage-full of Bramble leaves in less than a week and care must be taken that the insects are constantly supplied with fresh food. If weakened through starvation, any insect is prone to disease.

So long as they are kept warm, are sprayed every day, and have fresh food available at all times, the above species are very easy to rear and breed. The intending breeder should, however, always ensure that he has a good source of Bramble leaves at hand throughout the year—a small bush will be devoured by his ravenous pets before they are even fully grown!

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EDITORIAL

Once more:—Your new editor had a brief spell with the Bulletin in 1946-47 under the able tutelage of Mr. Beowulf A. Cooper who kept the Society's publications going throughout the war years. He now returns to the task and hopes that all old and new friends will inundate him with contributions. In particular he would like to receive short notes of a sentence or two, concerning such matters as records of rare species, new distribution records, migration records, and how about some rearing accounts of species other than Lepidoptera? Provided there are no further drastic printing cost increases it is hoped to hold the Bulletin to the increased size of 48 pages for the rest of this year.

Brian O. C. Gardiner (225)

COLLECTING NOTES—MAY 1974

The smaller moths

The theme in this issue is drooping or aborted shoots and I have selected three drawings by Mr. J. S. Noyes to illustrate my notes. The first depicts *Prays fraxinella* Bjerkander 1784, better known in this country under its junior synonym *curtisella*, Donovan 1793. The adult is bimorphic, the typical and prettier form being the one illustrated by Mr. Noyes. In this the forewings are creamy white with markings ranging from grey to dark fuscous. The termen is not so irregularly shaped as the picture suggests, but is conventionally symmetrical; however, the wing-scales project unevenly into the base of the cilia, usually giving a different outline to each wing-tip. The sharp dividing line Mr. Noyes has drawn before the cilia is misleading and the contours of the termen are not of diagnostic significance. The second form of the moth is melanic, the forewings being fuscous with the markings obscured; it occurs in upwards of 50% of the population.

The larva has three distinct phases, each with a different method of feeding. In the autumn it makes a short, Nepticula-like mine in the leaves of Ash (*Fraxinus excelsior* Linn.). It leaves this mine before the leaves fall and burrows beneath the epidermis of the twigs just below next year's buds. It continues as a bark-miner throughout the winter, feeding slowly (probably only during mild spells) and extruding frass close to the buds. When the young leaves begin to sprout in the spring, it comes out of its burrow and spins a cluster of them together at their base. Then it feeds on the petioles, causing the shoots to droop limply. This renders the larval spinning conspicuous and, as the species is common, there should be little difficulty

in finding it. Late May is the time to search for the larvae in an average season.

The second illustration shows *Yponomeuta plumbella* D. & S. The forewings are smoky white, sometimes with some grey shading, principally near the base of the costa. The spots are black. The apical spot and patch of dark cilia springing from it are the features which most readily distinguish this species from its relatives. Like *fraxinella*, *plumbella* has the terminal wing scales projecting unevenly into the cilia, as is well indicated in the drawing. The young larvae mine the shoots of spindle (*Euonymus europaeus* Linn.), causing them to droop; later on it spins the leaves. I have only once found these larvae, because I have only once searched for them. On that occasion I found them in numbers on the first tree I examined, and bred all I required. Possibly I was lucky, but I suspect it is usually as easy to find.

The third drawing is of *Argyresthia (Blastotere) glabratella* Zeller; at least, I think it is, for there are rumours that we in Britain are muddling our species in this group. What I shall say applies to *glabratella* as it has been understood in this country, but not necessarily to the species they call *glabratella* in the continent. The forewings are a uniform greyish ochreous. Mr. Noyes indicates a tendency towards a dark costal blotch, a feature not present in any of my own series of bred specimens. The larva mines the shoots of spruce (*Picea abies* [Linn.] Karsten), aborting their growth. It is to be found mainly on young trees up to 20 feet high. When the new shoots start to grow and the fresh leaves appear, the tenanted shoots remain dark and dead, and the old needles near the tip turn brown. You can test whether such a shoot contains a larva by breaking off the terminal bud with your thumb nail; if the shoot is tenanted you will find it packed with frass. When the larva is full fed, it gnaws an exit hole in the side of the shoot, generally an inch or two from the tip. It then seals the hole with silk and pupates within.

Other related species behave in much the same way. *A. laevigatella* H.-S. (*atmoriella* Banks) mines the terminal shoots of larch (*Larix decidua*, Miller), and *A. dilectella* Zeller, those of juniper (*Juniperus communis* Linn.). Having written these words, I went to an isolated ornamental juniper beside my front door, and now, less than a minute later, I am writing again with a model before me. The brown terminal needles instantly betrayed the mine. I notice quite a large entrance hole near the tip of the shoot, since this species, unlike the others I have mentioned, moves from shoot to shoot. I have had to dissect for about an inch before exposing the black-headed, pale green larva. Juniper bushes which do not harbour *dilectella* are probably rare, and some will also provide you with *A. abdominalis* Zeller, though this is a less common species. In East Anglia at any rate, if I go to the nearest stands of spruce and larch I can find *glabratella* and *laevigatella* without difficulty.

A more elusive quarry is *Sorhagenia janiszewskae* Riedl, for hitherto it has been recorded only from south Essex to Hampshire. The larvae of this

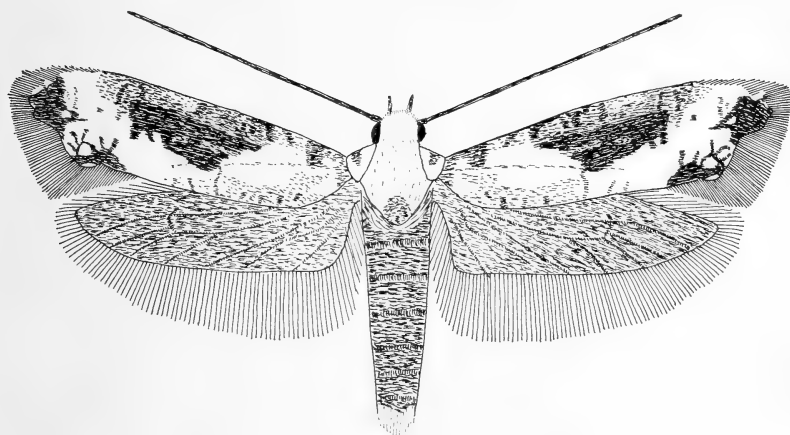


Fig. 1. *Prays fraxinella* Bjerkander (wingspan 15-17 mm.).

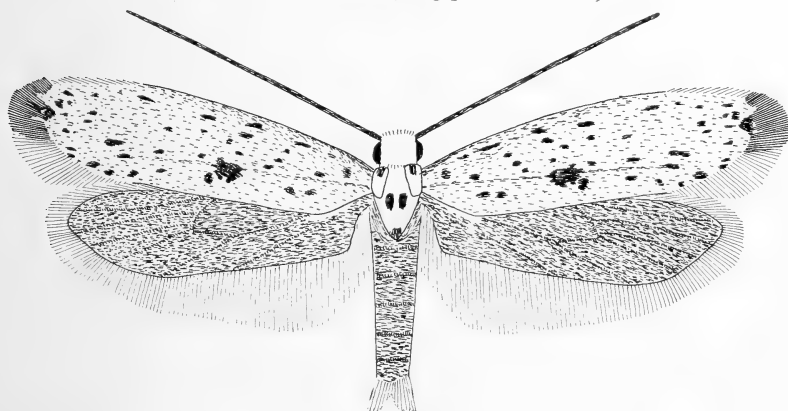


Fig. 2. *Yponomeuta plumbella* Denis & Schiffermüller (wingspan 17-19 mm.)

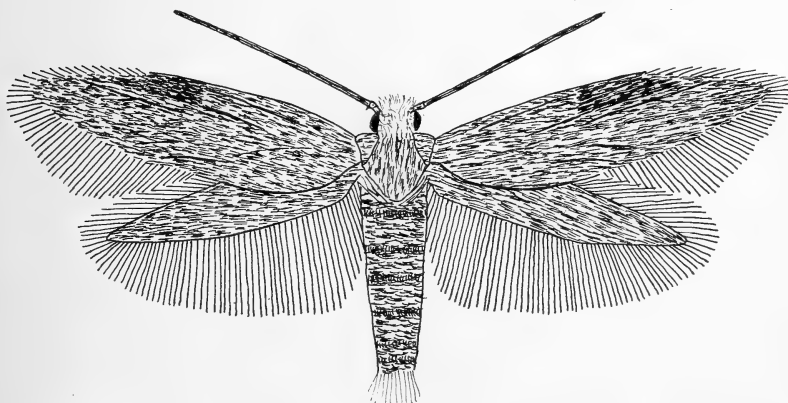


Fig. 3. *Argyresthia glabratella* Zeller (wingspan 10-11 mm.)

species mine the young shoots of alder buckthorn (*Frangula alnus* Miller), causing them to droop conspicuously. Early June is the time to look for them. This species leaves the shoot when fully fed, so if you can see a hole you know you are too late! In captivity the larvae will readily spin their cocoons in paper tissues.

It is virtually impossible to tell the imagines of *janiszewskae* from those of *S. ramniella* Zeller and *S. lophyrella* Douglas without dissection of the genitalia, but you can be sure of *janiszewskae* if you breed it, for it is the only one of the trio that mines the shoots.

A. M. Emmet (1379)

A.E.S. ANNUAL EXHIBITION, 1973

Our Meeting was held on Saturday, 29th September at the usual venue, Holland Park School, Kensington, London. Once again the weather was ideal following one of the best summers for many years which was reflected in the large enthusiastic attendance.

Suggestions made by the Council and Members for improving the style of the Exhibition were effectively carried out by the Organiser, Mr. P. W. Cribb and received general approval. The herculean task of providing the refreshments was undertaken by Mrs. Hilliard assisted by a team of volunteer ladies who worked virtually non-stop. The Council express their thanks to Messrs. P. W. Cribb who acted as Organiser pending the appointment of a regular Officer, E. S. Bradford our sign-writer, B. F. Skinner covering electrical matters, P. G. Taylor running the surplus material stall, Stephen Cribb manning the door and to the many other working members. Lastly and not least to the first class co-operation we have always received from the Schoolkeeper and his staff.

If a criticism has to be made, it was the perennial question of the relatively small number of Exhibitors compared with the estimated attendance of some 1,500/2,000 members and friends. The redeeming feature was the excellence of those received, notably the carefully planned projects. The lack was the smaller items which are also of interest and which do not entail a great deal of preparation.

Various opinions have been offered on this subject. Our fixed exhibition date of the last Saturday in September is too late for most live material and too early for the year's collections to have been arranged. In addition, most members are otherwise occupied in summer. This would suggest a change of date. Various autumn dates have been tried over the last 30 years but the present timing appears to be the optimum one for attendance. The obvious alternative is Spring. Otherwise the present situation allows members to meet at least once a year, giving the opportunity of replenishing equipment from the leading dealers present and the chance to exhibit their particular line of interest. Possibly a change of title to "Annual Conversazione & Exhibition" might be appropriate.

Brief descriptions of the exhibits, listed under the various Orders are:—

MACRO LEPIDOPTERA

Cribb, P. W. (2270)

Two cases of Butterflies taken in early May, 1973 in Greece from the Mt. Parnassus and Mt. Chelmos areas and the Sounion Peninsular together with a few examples of other orders. A series of *P. machaon* L. (Swallowtail Butterfly) from Poland, Bulgaria, Norfolk and Greece showing varied forms. Pupae of *S. pyri* L. (Great Peacock Moth) bred from Delphi. Nests of *E. aurinia* Rott. (Marsh Fritillary) bred for release. Larvae of *P. aegeria* L. (Speckled Wood Butterfly), *C. tullia* L. (Large Heath Butterfly).

Gardiner, B. O. C. (225)

Specimens of *P. brassicae* L. (Large White Butterfly) from S. America, examples of 3 bred aberrations (*flavus*, *nigrescens* and *nigronotata*).

Bibliographical researches in respect of "Hewitson on Butterflies" etc. Still shots of high speed ciné film of the flight of insects. Living specimens of the Squeaking Roach (*G. portentosa*) from Madagascar. Larvae of Florida Sphinx moth (*M. sexta*), feeding on artificial food.

Gardiner, C. (5249J)

Some Butterfly varieties taken in 1973. A study of the life history of *M. sexta* (Florida Sphinx moth).

Heath, P. M. (4167)

Moths taken in the Island of Skomer, including *R. sacraria* L. (Vestal), *A. xanthemista* Greg. (Black-banded), *A. trux* Steph. (Crescent Dart), *H. peltigera* Schif. (Bordered Straw) and *C. muralis* Forst. (Marbled Green).

Hilliard, R. D. (99)

Winter stages of common garden butterflies and moths. Also on behalf of Mr. N. W. Harwood of Guisborough, full grown larvae of *C. galii* Rott. (Bedstraw Hawk moth). This species is a rare migrant to Britain and there are very few published records of larvae found in this Country. Mr. Harwood states he counted over 130 larvae in a radius of 10 miles from his home, feeding on Rose-bay Willow Herb. The main concentration was in the Industrial Area of Teesside, notably the Steelworks at the mouth of the River Tees. There were several colour forms and most had pupated by the third week in September.

McCormick, R. F. (3375) and *Penney, C. C.* (3880)

Examples of Macro-lepidoptera of local distribution taken during 1973.

McLean, I. F. G. (3848) and *Warren-Smith, C. D.* (3908)

A collection of Butterflies taken during a visit to Var in Provence, France, April 9th to 17th, 1973 and slides of the trip. Also bred specimens and varieties of British lepidoptera.

Rawlins, A. (4857)

Species of African Butterflies illustrating the prevalence of mimetic forms.

Renshaw, C. (4418)

Two drawers of British Butterflies and Moths taken by the Exhibitor.
Sokoloff, P. A. (4456)

Some aberrations of British Moths including a fine specimen of *C. nupta* L. ab. *brunnescens* (Red Underwing). Also examples of the affect on wing shape of pupal damage.

Trebilcock, G. D. (2976)

Living larvae of *A. iris* L. (Purple Emperor Butterfly). Drawings and notes with butterfly specimens in relation to text book preparation. In conjunction with Mr. Stockley, a drawer of British Butterfly aberrations as shown in the new edition of Richard South's "British Butterflies" (T. G. Howarth). Also slides of the aberrations.

Tyler, D. E. (3865)

A small case of British Lepidoptera.

Waters, A. P. (2615)

A tray of butterflies taken in Scandinavia in 1973. The life histories of some European Butterflies including *M. aurelia* Nick. (Nickerl's Fritillary) and *E. aurinia merope* (Marsh Fritillary sub-species) with ova, larvae and pupae.

West, W. G. (4529)

A very good display of wing mounts of Lepidoptera, using clear plastic. The mounts are on cards which form the basis of a card index of the British species for identification purposes.

Williams, J. D. (4715)

Graphs and records of Moth trapping using a non-M.V. trap.

MICRO LEPIDOPTERA

This year microlepidoptera were exhibited by only four members, which I believe is two less than last year.

Moseley, K. A. (4733) showed live and set specimens of *Galleria mellonella* L. and set examples of *Achroia grisella* F. species that are sometimes found in beehives. *G. mellonella* L. were bred from wild specimens taken in Worcestershire. Living dwarf examples of this species were also shown and the reason for this dwarfing was, as far as Mr. Moseley understood, not exactly known. Perhaps a member can enlighten us? Dwarfing does occur of course, when conditions are hard and food supply scarce. Most of the dwarf examples seen were males, but whether this is a feature of any importance is uncertain. This moth is not now as common as it once was owing to increased hygiene and care among apiarists. *A. grisella* F. is a widespread and smaller insect more frequently found in beehives.

Emmet, A. M. (1379) showed mainly Nepticulidae apart from several specimens of a Coleophorid moth new to Britain. This was discovered by Col. Emmet in Essex and is one of the larger of the bronzy green metallic species and goes by the name of *Coleophora fuscicornis*. The Nepticulidae were represented by two drawers of these tiny but fascinating moths. If they were macros probably seven or eight drawers would have been needed. This

is one advantage of collecting micros—you can get a lot in one drawer. Accompanying the Nepticulidae was a book of pressed leaves containing a great variety of mines made by these interesting small moths.

Roche, J. (3096) exhibited some rather local micros collected at various places in the British Isles including: *Cosmopteryx druryella* Zell. from Kent, *Caryocolum inflatellum* Chretien., *Epermenia daucella* Pey. from Portland, *Witlesia borealis* Tengst. from Scotland etc. He also displayed a number of seed-heads of a variety of plants containing larval cases of several species of Coleophora. Among other interesting things in Mr. Roche's drawer were examples of *Ethmia decemguttella* Hubn., *Adela croesella* Scop. and *Glyphipterix haworthana* Steph.

Bradford, E. S. (3068) showed a drawer of mixed macros and micros, the bulk of which originated from the East Blean area of Kent. Among these were specimens of *Tubuliferola flavifrontella* Hubn., *Nemapogon fulvimitrella* Sodof., *Evergestis pallidata* Hufn., *Coleophora asteris* Muhl. and *Hysterosia inopiana* Haw. He also exhibited a number of leaves of trees and shrubs showing mines made by various micro moths. these were collected in the grounds of Holland Park School prior to the opening of the annual exhibition.

HYMENOPTERA

Betts, C. R. (4976) and Williams, P. (4965) A comprehensive exhibit of the Aculeate Hymenoptera (Bees, Wasps, Ants) with nests and combs in various stages with set examples of the adult castes. This was judged to be the best Junior Exhibit and was awarded the prize by the President.

Cribb, P. W. (2270) An indoor observation hive supplied by Mr. H. Kolb of Oklahoma into which Mr. Cribb had introduced a thriving colony of the Honey Bee.

DIPTERA

Aldridge, M. C. (4351) A box of hoverflies from Hertfordshire and some very preliminary distribution maps for these flies in the county. This was a worthwhile project and one where it would be nice to see the results of progress at future AES Exhibitions. It was encouraging to see a keen interest in the structure of flies, with slide preparations of genitalia and other parts and a large diagram of the mouthparts of a Muscid fly. There was an illustration showing the colour pattern variation in the drone fly (a hoverfly) *Eristalis tenax* L.

Crow, P. (391) A box of hoverflies demonstrating the exhibitors method of mounting flies. As one might expect from Mr. Crow, the specimens were immaculate. It is a pity that there was not an accompanying note on methods, but it would seem that setting boards were used in order to get the wings set nicely and the neatly arranged legs were presumably held in place with pins. A wide selection of species from this very diverse and interesting family were shown, including one of our greatest and most handsome rarities, *Calliprobola speciosa* Rossi, from Berkshire. It is

worth noting an important distribution record—*Arctophila fulva* Harris from near Newbury, Berks.

Payne, R. M. (2982) An interesting exhibit on greenbottles, bringing together most of the genera from the various calypterate families with metallic green flies, including *Orthellia* and *Dasyphora* (Muscidae), *Gymnochaeta* (Tachinidae) and *Cynomyia*, *Phormia* and *Lucilia* (Calliphoridae).

Else, G. R. (3881) Though primarily a hymenopterist, Mr. Else seems to have incredible luck for finding rare diptera. He exhibited two of our rarest British hoverflies—*Callicera aenea* (F.) and *Doros conopseus* (F.) both from Oxenbourne, Hants., and both taken this year. Most dipterists are lucky to take just one of these in a lifetime's collecting.

Stubbs, A. E. The Crane-fly Recording Scheme. A display on this national recording scheme, including distribution maps of *Ptychoptera*, a display of representative specimens of crane-flies and sample copies of the various newsletters, bibliographies, illustrations etc. which the scheme organisers send to participants. Only three people registered with the scheme—either most potential dipterists are already members or it was not realised the organisers are anxious to help beginners.

Setting Diptera: A demonstration by Alan Stubbs.

About twenty people crowded round a table for this demonstration. Field equipment and techniques of collecting flies were shown and the various methods of mounting flies were briefly demonstrated. Some advice was given on books for study. The demonstrator mentioned that he is listed as the Society's adviser on diptera so members were very welcome to write if they wished.

COLEOPTERA

St. Ivo School. A first class exhibit on the Burying Beetles (*Necrophorus* sp.) was staged by members of the St. Ivo Natural History Society. This included a series of excellent drawings of the various species in the Group with set specimens and life histories. The Judges considered this among the highly commended Junior Exhibits.

OTHER ORDERS

Braithwaite, R. C. (4995) A large Praying Mantis, alive in a cage.

Heath, G. L. (4409) This was again a first class display of a whole range of Mantid species, living and in various stages. This exhibit always enjoys a good audience.

Heath, P. M. (4167) A display of a study of the Pseudoscorpions with microscope studies etc. This was a commendable Junior Exhibit.

GROUP EXHIBITS

Conservation Group David Lonsdale (4137) and his helpers again produced an outstanding exhibit with illustrated examples of habitat types and their associated problems in relation to a conservation policy.

Also rearing and breeding exhibits including a nest of larvae of the Marsh Fritillary Butterfly (*E. aurinia* Rott.)

Exotic Entomology Group. Mr. D. J. Moon (3850) and members of the Group put on a very fine exhibit of the exotic Silkmoths including some of the largest known moths in the world.

Individual members exhibited as follows:—

Eschbacher, C. J. (3731) Live imagines of *Antheraea yamamai* (Japanese Oak Silkmoth), *Rothschildia orizaba* and *Dictyoploca simla* with their vacated cocoons. Larvae of *Actias luna* (American Moon Moth) feeding on Eucalyptus sp. Ova and newly hatched larvae of *S. cynthia ricini*, feeding on Privet.

Hamilton, C. J. (3890) Final stage larva of *Attacus atlas* feeding on Privet and a live female of the same species.

Moon, D. J. (3850) Set moths. Colour variation in *Gonimbrasia belina* and *Gynanassa maia*, both reared from wild Zambian ova. Cocoons of 32 species, races and hybrids of silkmoths (Saturniidae). Pen and ink sketches of Saturniid cocoons. Black and white photographs of the moth *Hyalophora gloveri* and larva and cocoons of *Rhodinia fugax* by Mr. Sutcliffe. A range of books and the Group's own Spring and Summer Newsletters for 1973.

Scott, I. (4700) Young nymphs of *Extatosoma tiaratum* (Spring Stick Insect).

St. Ivo School The Natural History Society again entertained visitors and members with a first class display of living insects, insect eaters and eaters of insect eaters. It is always a pleasure to have this enthusiastic group of juniors with us and to meet again their Director, Henry Berman.

Saruman Butterflies (P. Smart) An observation cage of live Butterflies from various parts of the world. Also type examples of Butterflies in danger of extinction or already extinct.

London Zoological Society Each year we are pleased to have the Zoo Entomology exhibit with its exotic Arthropods. We are grieved to report the death of Mr. Ashby who has been responsible for this Exhibit over many years. He died shortly before the Exhibition.

R. D. Hilliard (99)

A.E.S. PHOTOGRAPHIC GROUP—A PROPOSAL

I feel that the time has come to organise within the AES a section devoted to photography. Foundations have already been laid by Peter Cribb, who for some years has devoted a considerable portion of his time at the Annual Exhibition to showing slides from the society's transparency collection which he has been building up. Judging by the number of references to 35 mm. colour photography in Bulletin articles, there must be quite a number of AES members now combining their photographic skills with their interest in insects. There should therefore be no trouble in bringing

together a solid core of people to represent this aspect of photography.

I myself have concentrated on black and white photography, especially on close-up shots of insects and the like. There must be others with a similar bias, and I would hazard a guess that the majority of younger members possessing a camera use mainly black and white (often abbreviated to b/w). To start the ball rolling in this quarter, I intend to exhibit at the 1974 Annual Exhibition a number of my b/w prints of insects and their habitats, together with short explanatory notes.

In addition I shall be happy from now on to make prints from members' own negatives *at cost price only* (i.e. return postage, processing chemicals paper and electricity) in my own darkroom. I regret that at present I am only able to handle the so-called 35 mm. format, or smaller, which does not help those using 120 films and the like, but at least it is a start. The negatives sent to me for printing need not necessarily be close-ups of insects; habitats, localities, entomologists in action, equipment in use, and foodplants, are only a few of the aspects related to entomological activities which find their way, quite rightly, on to negatives. Negatives depicting Aunt Emily at Cousin Phil's wedding would not fall into this category (unless she happened to be chasing Holly Blues along the churchyard wall), but most other material, pertinent to some holiday, field trip, or just the (entomological) things you find yourself doing in summer, I should willingly take in.

This will, as I say, start things moving, but for the future I have the following in mind. The group as a whole would exist for the promotion of photographic activities within the AES, and also for the production of such photographic material as would from time to time be required by the society in connection with publicity, conservation, leaflet preparation, recording of field meetings and exhibitions, etc. Obviously some sort of periodical circular would be invaluable, but for a start a portfolio, containing prints of insects, habitats, and similar subjects, produced by members, could be sent round during the winter months from one member to another. Notepaper could be included for subsequent comments on the pictures, and the notes could later be typed out and included in the following year's portfolio so that everyone concerned could read other members' comments on their pictures. In this way a reasonably inexpensive substitute for an illustrated magazine could be made available. If the circulation were to grow too large, then two or three copies of each print would enable material to circulate more quickly through smaller groups. People like myself would be happy to produce these prints at the lowest possible cost. A maximum permissible period (eg four days) for retention of such a portfolio by each member would, of course, be decided in advance.

What is now needed is a focal point (if you will excuse the pun) for such ideas. To this end I should be glad if members interested in any aspect of insect photography (in its broadest sense) would write to me at: Korpitie 1,

Pikonkangas, Kangasala, 36200 Finland. I should be especially glad to hear from members in respect of the following:

1. An interest in insect photography (in the broad sense)—colour or b/w.
2. An interest in receiving from time to time a portfolio containing members' b/w and colour *prints*, together with comments from other recipients.
3. A willingness to make prints at cost price (like myself).
4. In need of prints from a set of negatives (negatives may accompany the letter). The size of print required (eg 10" x 8", 12 cm. x 9 cm., or other standard size) must be stated. A rough drawing should be included where only part of a negative is to appear in the print. Airmail letters to Finland take four days. Payment may be made, after receipt of invoice, by internal cheque or postal order to my UK address (appearing in the latest membership list).
5. Further suggestions.

For transparency enthusiasts, slides in double-glass frames could be circulated on a similar basis to the b/w prints, while the Annual Exhibition would provide a good opportunity for exhibiting a selection of members' work in both colour and b/w.

The main thing is, I feel, to make a start, such modifications as are deemed necessary from time to time being made at the appropriate stage. The fact is that the accent is today far more upon the living insect, and when the appearance of an insect in a hundred-thousandth portion of its life cycle can be documented on a piece of emulsion-coated celluloid, then we shall not set a good example to the next generation if we fail to adopt so honourable a substitute for large-scale collecting of dead specimens.

Leigh Plester (2968)

THE A.E.S. CONSERVATION GROUP

The article which appeared in the February 1973 Bulletin discussed some aspects of our rôle which I hope may now be more widely appreciated. Perhaps this one will prove more readable, my main aim now being to keep everyone up to date on our more noteworthy activities.

At our last meeting it was approved that AES members will be accepted as Group members (ie receive our publications etc.) for the reduced annual subscription of 20p. Non-AES members will be asked to pay the higher, but still modest, fee of 50p. It was also agreed that in future the Group's annual meeting will take place following the AGM of the Society so if you want to air your views on conservation (and influence our policies), you should attend then.

The number of habitat sites being dealt with has continued to increase. Two main categories of action seem to have emerged where sites are concerned; firstly, approaching local authorities about sites which they

could help to protect as reserves (and/or as educational resources); secondly, to assist actual recording work, surveys and management in areas which county trusts believe (or could believe) to be of interest. These two categories only exist because of local conditions; the first arises from the existence of urban or suburban sites of interest which have been neglected owing to their location and, for the same reason, are under special threats from planning schemes produced without appreciation of their biological interest.

Taking some examples of the first category, Mr. Cribb has prepared preliminary and full reports on the amenity and conservation potential of the River Crane area near Hounslow Heath, Middlesex. Some survey work has been carried out and pilot work on litter clearance from the river has been started with the help of local people including children from Feltham School. Mr. Cribb has also outlined plans for more major clearance and drainage work which we hope will be approved by the Borough Councils of Richmond and of Hounslow. On the other side of the London area, it appears that we may have been helpful in modifying the Greater London Council's views on the future of Tower Hamlets Cemetery. When the Council bought these twenty seven acres for use as a much needed passive recreation area, the clearance of the dense undergrowth and many of the younger trees was proposed. Realising that "overgrown" sites are of some rarity value in London, some local people approached the Council and made their opposition public in a local paper. I understand that a letter which we sent the Council at that stage might help to lead to a generally acceptable compromise.

As far as the work with Naturalists' Trusts is concerned, a number of Group members are studying areas and supplying information, but one particularly useful thing that has cropped up is the recent accumulation of members in the S. E. Lancs./N. E. Cheshire region. There are now six of us in touch with the Conservation Officer of the Cheshire Trust, Mr. S. E. Crooks, and he has supplied a list of places which we have started to survey. Amongst these has been Stanleyhall Wood near Disley, N. E. Cheshire. This entomologically valuable area was the subject of a public enquiry in August 1973 for which we were able to supply entomological evidence. The favourable outcome of this has been the upholding of the Tree Preservation Order which had been made by Disley R.D.C. and then opposed by the landowners.

Some of us are accused of being over-cautious when it comes to releasing bred insects and it is pleasant to be able to mention some work of this kind which, as well as being approved by the Biological Records Centre and the local Trust, has met with initial success. Following a survey in Hampshire by a member of the County Trust, Cmdr. W. L. R. E. Gilchrist, an area was found which seemed suitable for establishing a colony of the Marsh Fritillary (*Euphydryas aurinia* Rott.). This butterfly is especially subject to habitat destruction through drainage and changes in

land use. Group Chairman, Mr. P. W. Cribb, supplied the larvae for the project and about 400 (ex Sussex stock) were "put down" in April 1971 over a rectangular zone of approximate size 140m. x 5m. The foodplant *Scabiosa succisa* L. (Devil's-bit Scabious) was present here. During the 1971 flight season Mr. S. R. Miles noted several sightings and the adults were again present in the following season. In 1973 at least twenty adults were seen by Mr. Miles, sightings being made over a very wide area around the releasing zone. Future observations should help our understanding of the value of such work.

There is also some news which is, unfortunately, of a rare kind. Mr. E. S. Bradford has made arrangements for the purchase of some very interesting woodland at Childs Forstal/Underdown Wood in Kent. We look forward to adding to the insect records and supplying suggestions for management which, it is planned, will be under the control of the Kent Trust for Nature Conservation.

The policy of holding field meetings has continued and several members attended a meeting at Ditchling Common. This was led in early June 1973 appropriately by Mr. Cribb, who made it a working meeting by organising some conservation "task work" during that weekend. Much of this was carried out by Conservation Corps members. Details are given in Group Bulletin No. 9.

A week's trip to Cowley Wood Conservation Centre was also organised; details of this are to be supplied elsewhere. Quite a large number of insect species were recorded or (where essential!) taken for subsequent identification and we hope that some contribution will have been made to the management of the Centre. I should like to hear from any members of the Society who are interested in another organised trip, though it may be more convenient to reply as individuals to the Centre's advertisements. Collecting, as such, is not allowed, I should add.

We have continued to publicise our cause and to circulate bulletins. I can mention, in particular, one aspect of this work of circulating ideas and information; our Information Sheet, sent out in January 1973 to all British county and regional trusts as well as to many other bodies, has helped establish an encouraging number of new contacts. I am also pleased to note here that one of our pet ideas, the preservation of oases of wildlife in urban areas, has been drawn to the attention of members of the Institute of Park and Recreation Administration. Writing in the October issue of their journal "Parks and Recreation", Mr. Cribb has stressed the need for a fresh look at the value of old cemeteries and other areas. Information from other bodies also reaches us in the shape of bulletins and leaflets, including regular issues of Field Studies Council Reports and the Bulletin of the International Union for Nature Conservation. I can, if requested, lend these leaflets etc. to Group members.

Finally, it must be re-emphasised that success depends upon the effort of individuals. Members of the AES have a wide range of interests but most of

these could be integrated with some involvement in conservation. Insect conservation will never reach the status it deserves until there is a co-ordinated effort involving entomologists, their local trusts and a body or group of bodies which will turn otherwise isolated actions into a recognisable campaign. I hope that this outline of our recent activities may heighten members' awareness of the need for this effort.

David Lonsdale (4137)

A REVIEW OF TWO WEEKS IN HAMPSHIRE

At 6.30 a.m. on July 15th 1973 we set off from Crewe, our destination Hampshire, the great "Mecca" of insect life. As we approached Salisbury we decided to head for the Butterfly farm at Sherborne, where we arrived at 12.30 p.m. Leaving Sherborne we made our way towards Bournemouth, but soon stopped at Buckland Newton, a small village some twelve miles from Sherborne. Along the tall grassy banks which bordered the narrow country lanes we noted the Ringlet (*Aphantopus hyperantus* L.), and soon we saw the Small Skipper (*Thymelicus sylvestris* Poda) as we explored the nearby fields. Flying across almost every field were the three common "Whites", the Small White (*Pieris rapae* L.), the Green-veined White (*P. napi* L.) and the Large White (*P. brassicae* L.).

The following day we went to Worth Matravers, used in the past by many famous collectors. Newman (1967) comments "... leave your car at the Square and Compass, a famous pub run by a namesake of mine, in order to make your way to the sea. It is some distance before you reach the breeding ground and to get up to the top of the surrounding hills is quite a stiff climb; but once there you have the most magnificent view over the channel, and on a fine day with little wind you have collecting under perfect conditions". Following these instructions we soon noticed how rich this area was in Lepidoptera, yielding many butterflies and moths such as the Dingy Skipper (*Erynnis tages* L.) and the magnificent Silver Y moth (*Autographa gamma* Linn.), the latter we found in a colony consisting of some ten to twenty specimens. It wasn't long before we saw our first "Blue" it was the Small Blue (*Cupido minimus* Fuessl.) found in a small colony basking on the chalk path in front of us, as was the Dingy Skipper mentioned earlier. We also noted the Meadow Brown (*Maniola jurtina* L.) and the beautiful Chalkhill Blue (*Lysandra coridon* Poda).

The next two days were spent in the Wareham Forest which proved to be very rewarding. Our old friend the Large Skipper (*Ochlodes venata* Br. & Grey) and the Gatekeeper (*Maniola tithonus* L.) were seen in abundance flying in the open glades of the Forest, the latter very fond of resting on ferns. As we walked into the heart of the Forest on one of the Forestry Commission walks we noticed the Grayling (*Eumenis semele* L.) becoming more abundant, and at the end of the walk we had counted five or six colonies, about ten to fifteen imagos in each. In dull weather *E. semele* uses

its camouflage superbly, resting on the bark and the undersides of branches of fir trees. However in sunny weather it rests on the ground, aligning its wings in such a way that they cast no shadow whatsoever and also on hot days frequently visits the sap oozing from fir trees.

On the 18th we went to Durdle Door, just a stone's throw away from Lulworth Cove, the home of the Lulworth Skipper (*Thymelicus acteon* Rott.). The first butterfly we saw was the piebald Marbled White (*Melanargia galathea* L.), and soon we discovered a colony of Chalkhill Blues, along with the Five-spot Burnet (*Zygaena trifolii* Esp.) and the Six-spot Burnet (*Zygaena filipendulae* Linn.). Towards the summit of one hill we discovered the Dark-green Fritillary (*Mesoacidalia aglaja* Linn.) just emerging, and, lower down we disturbed a Small Tortoiseshell (*Aglais urticae* Linn.) just waking up as the early morning sun lifted the sea mist.

The following day we returned to the Square and Compass where we saw the Red Admiral (*Vanessa atalanta* L.) in its full splendour feeding on the "Butterfly Bush" (*Buddleia davidii* Franch.). One Painted Lady (*Vanessa cardui* L.) visited the bush, but was gone in a flash as I made a move to net her.

We saw no more different butterflies until we entered the Bolderwood Nature Reserve near Lyndhurst in the New Forest. A few hundred yards into the walk we came to a sheltered spot containing a large Bramble bush which was "alive" with butterflies.

We listed the following:— Grayling, Silver-washed Fritillary (*Argynnis paphia* L.), Gatekeeper, Meadow Brown, White Admiral (*Limenitis camilla* L.), Small Heath (*Coenonympha pamphilus* L.) Large White, Small White, Ringlet and Green-veined White.

Continuing on the Mark Ash Walk we came across another such corner. The first thing that struck my eye was a herd of deer, about 200 yards from us, but they soon scattered as I began to net various butterflies. One newly emerged Peacock (*Inachis io* L.) flew past us above the trees, followed a few seconds later by Brimstones (*Gonepteryx rhamni* L.) and one solitary Comma (*Polygonia c-album* Linn.). Silver-washed Fritillaries were in abundance but every specimen I caught was badly torn around the wings, perhaps this is due to flying through trees. A remarkable specimen which was caught was of *Argynnis paphia* var. *valezina*, a form which is well known in the New Forest. The ground colour was a beautiful bronze-green colour and the black markings were very heavy, the underside was as in a normal adult.

The final day of the holiday was spent on Durlston Head near Swanage, where we saw two new species, they were the Large Yellow Underwing (*Triphaena orbona* Hufn.) and the Oak Eggar (*Lasiocampa quercus* L.).

Looking back on the last fortnight I can safely say that the insect life in Southern England, particularly Hampshire is now on the increase.

N. A. Ball (5000)

REFERENCE

Newman, L. M. (1967). *Living with Butterflies*. John Baker Ltd., London.

NOCTURNAL EFFORTS—MARCH-MAY 1973

The following being a brief summary of my achievements armed with only pressure lamp, kite, net coffee and a variety of heavy clothing.

From the middle of March I found the Dotted Border (*Erannis marginaria* Fab.) fairly frequently sitting about at the extremities of the birches in a wood near my home, and also netted several flying along hedgerows around Farnborough, Kent: these were of course males; I kept an eye open for the wingless females throughout March and April but found none. Other geometers taken with the net were the Early Thorn (*Selenia bilunaria* Esp.), Shoulder Stripe (*Earophila badiata* Schiff.), and three males of *Alsophila aescularia* Schiff. (March-moth), one on March 26, one on April 7, and a late one on the 14, all in fine condition. The first two *S. bilunaria* I found were sitting on the ground amongst ivy (*Hedera helix*), seemingly disinclined to fly.

On March 19 a male Red Chestnut (*Cerastis rubricosa* Schiff.) obliged by flying into my net in the wood, and the next evening a male *Achlya flavicornis* Linn. (Yellow Horned) did likewise. The only other noctuids I somehow managed to catch (this must surely be the most hopeless method of collecting this group of moths) were a couple of Early Grey males (*Xylocampa areola* Esp.) one on the 20th, the other quite late on the 21st, and a solitary Powdered Quaker (*Orthosia gracilis* Schiff.), near Farnborough, where I also netted a female Hebrew Character (*O. gothica* Linn.), which supplied eggs. A female *Conistra vaccinii* Linn. (Chestnut) although probably paired refused to lay however.

As regards larvae, *Euschesis ianthina* Schiff. (Lesser Broad-border), were everywhere on Cuckoo Pint (*Arum maculatum*), with a sprinkling of *Lampra fimbriata* Schreber. (Broad-bordered Yellow Underwing), which were mainly on Bedstraw (*Galium* sp.) growing along the hedgerows. *Noctua pronuba* Linn. (Large Yellow Underwing) was also feeding on *A. maculatum*; the only other larvae of any note were numbers of *Amathes triangulum* Schiff. (Double Square-spot) on the leaves of Hemp Agrimony and Ivy, and plenty of *E. comes* Hubn. (Lesser Yellow Underwing) on just about everything except grasses. The only geometrid larva seen were a few *Aleis repandata* (Mottled Beauty), on wild rose and hawthorn. Leaving the Farnborough district on the night of April 12, I netted a male Dotted Border var. *fuscata* Mosley, probably my best find in this area. Noctuid larvae were rather less easy to come by in the woods near Bexley during April, but *Polia nebulosa* Hufn. (Grey Arches) was in small numbers on the willows; I noticed the larvae always seem to feed on unopened leaf buds, rarely do I find them on bushes starting to leaf. *E. comes* larvae in woods seemed to prefer birch buds, and were in company with a few *Diarsia mendica* Fab. (Ingrailed Clay) and *A. baja* Schiff. (Dotted Clay). Whilst searching amongst grass to find a larva I had dropped, a full grown

Apamea remissa Hubn. (Dusky Brocade) gave itself up to me. This more or less concluded my efforts for April.

As for some time I have given thought about searching for the larvae of some of the coastal species, and having "broken" in as it were the new pressure lamp I had purchased I decided to head westwards to Portland and try my fortune there. A vicious wind greeted my arrival at Church Ope Cove on the east side of the island, and after several attempts I eventually got the lamp lit at around nine o'clock on the night of May 4, after having first explored the most likely looking spots. I confined myself to a small area directly above the cove, but the night produced only a sprinkling of larvae of two main species, *Eumichtis lichenea* Hubn (Feathered Ranunculus) which were feeding on Red Valerian (*Centranthus ruber*) which was just starting to flower, and *Aporophyla nigra* Haw. (Black Rustic) also on this plant; four larvae of this species, seven of the former. One larva of *E. lichenea* however I found on *Viburnum lantana* (Wayfaring-tree). I also came across on valerian about a dozen geometrid larvae I could not identify. These later all perished.

A week later I tried the west side of the island at Chesil, and, in and around the disused stone quarries I managed a further fourteen larvae of *lichenea* on valerian nearly full grown, and half a dozen smaller ones on the same plant. A full grown Cream-Spot Tiger (*Arctia villica* L.) and a single larva of *Leucania l-album* L. which at the time I did not identify as such, on grass, were the only other larvae found.

On May 18, I tried the Isle of Wight, firstly at St. Lawrence near Ventnor, where I found two larvae of *A. nigra* on Sea Thrift, then on the 23 at Compton Bay, two more, and plenty of *Lasiocampa quercus* L. (Oak Eggar) feeding on Birds-foot Trefoil (*Lotus corniculatus*), mostly full grown. Finally on the night of May 24 at Freshwater Bay a further two *A. nigra* on thrift. One species I was disappointed not to find was *Agrotis trux* (Crescent Dart) which is supposed to feed on thrift etc. until May, in rocky areas; I have yet to find an Agrotid larvae at night of any species.

To conclude with a brief mention of two evenings in early June; on the third near Bexley I obtained 13 larvae of *Anchoscelis helvola* L. (Flounced Chestnut) all up and feeding on young oaks along the rides, and on the 14th on the coast at Shell Bay in Dorset about 30 larvae of *L. litoralis* Curt. (Shore Wainscot) on Marram Grass, and two *L. trifolii* Schiff. (Grass Eggar) young larvae on heather.

As a summing up I might add for the benefit of anyone contemplating searching at night for the first time, especially in March and April, to have an abundance of warm clothing, patience, and particularly when working bushes at eye level with a pressure lamp, plenty of strength in one's right arm!

**JOINT COMMITTEE FOR THE CONSERVATION OF
BRITISH INSECTS
RARE AND ENDANGERED SPECIES—GENERAL LIST**

Recently, lists of Macrolepidoptera, and of Odonata and Orthoptera, which this Committee considers are at risk in Britain have been published. The Committee has now compiled a short list of other British insects which it also considers should be collected with restraint. Because such insects are not subject to the same pressures from collecting it has not been necessary to compile a long list despite their much greater numbers. Moreover the criteria adopted in selecting species for inclusion on the list have not been exactly the same as those which are appropriate for the more popular groups. Only species which are either particularly conspicuous or easily collected, or which are known to occur in only one restricted locality have been included. In some cases both these criteria apply.

The Committee is aware that it may be criticised for suggesting that species outside the popular groups may be vulnerable to over-collecting. It appreciates that in many cases the knowledge does not exist which would enable a fully informed decision to be taken on such matters. On the other hand the Committee believes, first, that a policy of restraint in collecting very restricted species is necessary because they are especially vulnerable to threats of other kinds. Secondly, it believes that each case should be judged on its merits, as far as this is possible. Thirdly, it is anxious to avoid any impression that the collectors of the more popular groups, particularly Lepidopterists, are alone being singled out for implied criticism. The "general list" has been kept short, partly because of a lack of up-to-date information and partly for the reason stated above, but more particularly because the Committee believes that long lists are self-defeating.

The Committee urges all entomologists to follow the advice given in the "Code for Insect Collecting" and to exercise restraint in collecting the following species:

Hemiptera-Heteroptera

Geotomus punctulatus (Costa) (Pentatomidae)

Gonocerus acuteangulatus (Goeze) (Coreidae)

Hemiptera-Homoptera

Cicadetta montana (Scopoli) (Cicadidae) (New Forest Cicada)

Lepidoptera ("Microlepidoptera")

Hypercallia citrinalis (Scopoli) (Oecophoridae)

Nothris verbascella (Hübner) (Gelechiidae)

Aethes rutilana (Hübner) (Cochylidae)

Agrotera nemoralis (Scopoli) (Pyrilidae)

Cnaemidophorus rhododactyla (Denis & Schiff.) (Pterophoridae)

Stenoptilia pneumonanthus (Büttner) (Pterophoridae)

Coleoptera

Omophron limbatum F.

Chrysolina cerealis (L.)

AN EXPEDITION TO GREECE—MAY 1973 (Concluded)

Next morning we were down at the ferry port at Itsea by 7.15 in order to be sure of a place and were first in the queue but five coaches which arrived much later were loaded first. The fare for the two of us and the car was a little over £2.50 for a three hour trip—considerably cheaper than the shorter journey across the Channel. The Gulf was absolutely calm with a slight mist as we chugged along the rugged coast past villages isolated but for the sea and then suddenly turned across the Gulf towards the port of Aegion behind which we could see the snow-tipped mountains of the Mt. Chelmos group catching the morning sun. Aegion is an untidy little town and we quickly drove away from it through the lemon groves and Diakopton, taking the old coast road. The lemons were being harvested and were huge compared with the ones that are sold in Britain. Eventually we came to a right fork which passed under the new motorway and then climbed up and up into the mountains through attractive countryside to the top of a wild and high pass. Just below this we passed the monastery of Megaspelion—the giant cave. This is a new building replacing many old ones destroyed by fire and is set in a cave overlooking a deep gorge, the front face being almost flush with the cliff face. The road then dropped along the side of the gorge on the opposite side of which ran a miniature railway leading to our destination, Kalavryta. This is a small village in a plain, ringed round with mountains. Mt. Chelmos stands above it to the east, reached by a rough dusty road which climbs up from the village past the Place of Execution. This is where the Germans executed the inhabitants of the village during the last War, 1,300 of them from children of a few years to the old people, as a reprisal for attacks by partisans in the mountains above. The site is covered by a huge cross and concrete panels which bear the names of the dead whose bones lie in boxes in the mausoleum below. The village was burned at the same time but has been rebuilt. We took up our room in the Hotel Maria overlooking the main street with a large colony of Lesser Kestrels nesting in the eaves of the house opposite. These screamed continuously, hunting in the fields and slopes around the village. In the afternoon we took the dust track up towards Mt. Chelmos and explored the slopes and meadows but again found that at the higher altitudes there was nothing about. Heavy grazing had taken place on the slopes and we saw only migrant species on the wing.

Life in this area is still very primitive and we saw ploughing with mules and every morning the milk was brought into the village from the surrounding slopes (in small churns) on donkeys or mules. The plain is crossed by a small river and along the meadows beside it the land seemed quite fertile. Driving out towards the South West along the road to Patras we stopped by the roadside where there were water meadows and a large marshy area alive with frogs. Here we saw *M. cinxia*, *M. phoebe*, *E. ausonia*, *P. daplidice*, *E. cardamines*, *S. orbifer* and *Pyrgus* spp. flying right at the roadside. The sun was still hot at 4 p.m. and we walked across to where the marshy area

was and found a large number of species on the mud patches. Fresh Wood Whites, *L. sinapis*, together with *P. napi* and *P. rapae* and a few *P. ergane*, *P. thersites* and *P. icarus*, *A. agestis*, *C. osiris* and a new Blue to me, *Cyaniris helena* Stdgr.; these last were all males, settled on the wet patches left by the irrigation channels. It is a beautiful Blue, similar in size to *C. semiargus* Rott. of which it was once considered a sub-species. The underside has a tell-tale orange patch at the base of the lower wing. Dr. Higgins gives the date of appearance of this butterfly as June/July but we found it everywhere in this area by water and towards the end of the week females began to appear. We met a young Greek schoolboy who could speak good English and he told us that the season was late and that up to a fortnight previous there had been bitterly cold winds. This would indicate that the butterfly is a much earlier insect than supposed and the specimens referred to by Dr. Higgins could well be a second brood, which does occur with *C. semiargus*. Another species just emerging was the Copper, *Heodes tityrus* Poda, which we found flying on the roadside beside the car. Also flying round the bushes were some Speckled Woods, *P. aegeria*, of the ginger form. Those taken in Yugoslavia in the previous year had all been like our own race.

In the evening back in the village we tried the restaurant in the village square by the church. No menu is provided and one takes a cursory glance at the contents of the various pots before settling on what one is to have. It is usually a one course meal of stewed lamb, chicken pieces or very doubtful veal with rice, washed down with a strongly resinated wine—an acquired taste. We had chicken (kotopoulo) which turned out to be all wings and necks. The next night we tried another restaurant which appeared to have the rest of the chicken, as “kotopoulo” here was all breasts. On the morning of the 8th we drove up to the monastery at Megaspelion and collected in the wooded slopes just below it. The ground was covered with a carpet of soft pink Cyclamens, *C. graeca*, and in the clearings there were quite a few butterflies on the wing. Many of the species seen at Delphi were present plus the Small Blue, *Cupido minimus* Fuessl., the Green Hairstreak, *Callophrys rubi* L. and *C. helena*. *A. gruneri* was quite common. I nearly got my net on a fine specimen of the Large Tortoiseshell, *Nymphalis polychloros* L., and I was able to photograph a real monk. We drove on over the pass and collected by the roadside lower down. There were some fine Brown Bee Orchids growing on the slopes and everywhere large lizards. When I got back to the car at the end of the morning I found Coleridge struggling with something in his net. He had caught a huge snake nearly 6 ft. in length. As it was obvious we needed some bag to put it in, we drove back up the pass and stopped at a farmhouse where I bought a plastic sack. Back in the village we managed to buy a hessian sack and the snake was transferred to this, in which it lived quite happily for the rest of the trip. It was a Four-lined snake, a constrictor, which when full grown is about 8 ft. in length. On the next day we took the Patras road again and drove on to where the road fell away from the plain into a valley. We ex-

explored the meadows above the road here and again found them rich in butterflies. In the corner of a small field I saw a flash of copper and eventually netted a male *Heodes ottomanus* Lfbvre. By staying in this spot I was able to take two more males and a female. *H. tityrus* was also common here, it being a very large form with fine markings. It was very hot and we drove down to a small village where we had some lemonade in the shop-cum-police station. The lemonade is pure lemon juice and very refreshing. On the way back we stopped by a small quarry where I took a rubbed Nettle-tree Butterfly, *Libythea celtis* Laich. and saw a Camberwell Beauty, *N. antiopa* L. During the day I had managed to catch four lizards which we added to our vivarium back at the hotel. It had been so hot that the next day took us by surprise. We drove up to the monastery of Agia Laura (St. Laura) which stands on a spur high above the plain. The slopes all around are green and lush, strewn with small streams trickling down. Here we started to explore but the weather had changed totally. The wind was bitterly cold and the sun fitful. Among the bushes were dozens of Tortoises—in one clearing I came upon four males and one huge female, holding a conference. We found a few *C. osiris*, *C. helena* and nearly caught another huge snake. When we got down to the road I was very cold and Coleridge nearly blue so we went back to the village and decided to find a warmer clime. During the night Coleridge developed slight bronchitis and as the morning dawned just as cold, we rose early and packed. While we were doing this and checking the snake, the landlady happened to see it and immediately had hysterics, hiding in the next bedroom and locking the door. Her daughter heard the commotion and came to see what was up—promptly screaming as well and locking herself in the toilet. We eventually coaxed them out to pay the bill and say farewell. Taking the road back to Diakopton and the Gulf, we stopped there for a short break and took some rubbed specimens of *Plebicula amanda* Schneider and saw dozens of *P. podalirius*. We avoided the Motorway and drove all along the edge of the Gulf, now whipped by the cold wind into white caps, until we reached Korinth. Here we took the new Motorway across the isthmus to Megara where we hoped to find a hotel. There was none so after discussing the options we decided to drive on towards Athens. On the outskirts we turned off towards the port of Piraeus and skirting the sea we eventually reached the road leading out past the airport where we had started our journey. Beyond this is the Sounion Peninsular and after a few miles we stopped near a group of hotels overlooking the Aegean. The most reasonable and attractive was at Voula, the Hotel Ira, with an English speaking host and we had a pleasant downstairs room next to a garden planted with great bushes of Pelargoniums and lemon trees. Here it really was hot again and I was happy to take a swim from the water-skiing station below the hotel. The sea was cool and I got spiked by some sea urchins on the rocks. In the evening we walked along among the scorched dry grass fields by the hotel and disturbed a butterfly which we had come to find, the large Balkan Marbled White, *Melanargia larissa* Geyer. It is a huge butterfly in

the female and our discovery promised well for the morrow. This area is part of the holiday centre of Greece and there were already a lot of people about so we drove along the peninsular for a mile or so and turned off up a side road to what turned out to be the local refuse tip. The slopes around were rock strewn and supported a dried-up wiry grass. *M. larissa* was everywhere sitting on large purple thistle heads and among the grasses were dozens of a beautiful Neuropteran with broad forewings and long tail-like hind wings. I took some new Satyrids, *Hipparchia aristaeus* Bon. and *Satyrus ferula* Fab. and the first specimens of the Meadow Brown, *Maniola jurtina* L. of the trip. All were males so they were just beginning to emerge. I spotted a new Skipper whizzing around a pile of stones and eventually managed to net one. It turned out to be a new species for me, *Gegenes pumilio* Hffsgg. Flying with it were several Lulworth Skippers, *Thymelicus acteon* Rott. As I climbed over the stones I nearly trod of a very large snake which had half swallowed a dead rat. It reared up and ejected the rat before disappearing among the rocks. There were several tortoises about among the rubbish. Coming in from the sea was a continual stream of Bath Whites, *P. daphidice* and *E. ausonia*, flying against the off-shore wind. They were huge specimens and the latter were so big and so strongly marked as to appear to be a different species from those taken some days earlier at Delphi and Kalavryta (Higgins refers to those in the Balkans, ssp. *crameri* Butler, as being very large particularly in the second brood). If these were second brood specimens then the first brood must be very early or could these have been migrants from Crete or N. Africa?

In the afternoon we drove to the tip of the peninsular to see the Temple of Poseidon which stands on the tip looking south towards Crete. It is a wonderful view out over the Aegean and the sunsets here are famous. We had a drink in the café below the temple—at exorbitant prices—and later drove the 46 km. back along the winding coastal road to our hotel. Sunday, the 13th May, was our last day and we found the inshore wind had increased in velocity so that collecting was extremely difficult. We explored the slopes and valleys behind the coast and at another pile of rocks I was able to take four more *G. pumilio*.

Despite the high wind there was still a steady stream of *E. ausonia* and *P. daphidice* coming in over the coast.

While sitting on a rocky slope I noticed a wasp attacking a grasshopper (Locustidae) about twice its length. It appeared to sting it in the joint between the head and thorax and then when it was immobilised it straddled it, seized it behind the head with its jaws and dragged it, head forward, along the ground for about two yards over the rough ground to a large rock which had a hole in it. It pushed the grasshopper into this hole and disappeared with it, to emerge a few minutes later and fly off.

That evening we packed ready for our departure the next day from Gilfadia Airport. We returned the car intact to the agent there and were searched before boarding the Comet for home. The large snake and the

lizards in Coleridge's shoulder bag passed undetected. Our trip back was along the Adriatic coast and then over the Lepontine Alps, still deep in snow. We saw Mont Blanc far to the east poking up through the clouds and early in the evening we landed at Gatwick in perfect weather. It had been an interesting and fruitful fortnight which had gone without a hitch. Travel arrangements were made through Oceanways Travel Ltd. of London who arranged air travel, the car and hotel at Delphi.

P. W. Cribb (2270)

REFERENCE

Higgins, L. G. & Riley, N. D. (1970). *A Field Guide to the Butterflies of Britain and Europe*. Collins, London.

ACCESSORY BEFORE THE FACT

A policeman may be temporarily befuddled by a ladybird that resembles a Colorado beetle, but it takes a whole storebox to really give his grey cells the jitters. Take, for instance, recent events that occurred in a Finnish village.

I returned home one evening last November to find a strange man in my living-room. My wife was moving about with unusual agitation and an even greater disarray of storeboxes than normal greeted my tired eyes. Beaming benignly, the gentleman dashed forward with hand outstretched, so that I immediately thought him either an encyclopaedia salesman or an Elasmobranch in the employ of the local taxation department. In this, however, I did him an injustice.

It transpired that a certain club in the nearby city possessed as a motif a scintillating butterfly that I understood to be a rough copy of the local brand of swallowtail (*Papilio machaon* L.). The visitor, now walking down an aisle of pungent storeboxes, was also the secretary of this club and had heard, via the local museum, of my small side-line, which consists in supplying a few tropical insects to museums and similar institutions (Motto: If you can't sell fridges to Eskimaux, try peddling lanternflies to Finns). The club was celebrating its umpteenth anniversary on the following afternoon and could I supply one hundred set tropical swallowtails, each looking a bit like the local fellow, and costing about 10p each?

Of course, it was impossible, and we finally agreed on a set of ten butterflies, including Pierids from Bolivia and a blood-red *Cymothoe sangaris* Godart from Africa—all of which was pushing the swallowtail concept a bit far, though it is doubtful whether any club member raised his voice, thickly, in protest the following afternoon.

Most people seem to have the idea that exotic butterflies come in a handy do-it-yourself pack that only needs a spot of glue and a grub-screw to set the thing up (which, having been the recipient of material from *some* suppliers is not, I must admit, entirely without justification). Naturally, I had to supply him with a box to put the poor things in, as he had at last realised that his wallet would not after all be suitable.

Wood being these days a much sought-after commodity, with a price to match, having storeboxes made is now an expensive undertaking, even where the pines grow thickly and millipedes still find an abundant supply of their Daily Bread. I unearthed the last of a noble band of storeboxes that some nameless devotee had had put up an aeon ago in a distant land from a material resembling pre-stressed teak. It was the sort of box that even a moron would find difficult to fracture. Nevertheless, I think the gentleman understood that I really would perform an unpleasant operation on him with a rusty scalpel if my cherished box were to go astray.

He flipped a visiting-card on to the table and then disappeared into the darkness whence he had come, clutching his box of specimens. It is possible that, owing to the sudden change in temperature and humidity, wings warped right, left and centre. But it didn't worry me in the least: I was busy trying to fit half a million storeboxes back into impossible nooks and crannies.

Time went on and the borrowed storebox which was supposed to be delivered, by van, to the police station at which my wife wiles away her working hours, failed to put in an appearance. As she also controls the telephone switchboard, my wife was able to enquire freely after the whereabouts of the box. After a complicated interrogation that left the Republic of Finland several pounds the poorer, she elicited the information that the box had already been dutifully delivered. She then dashed from department to department at the speed of light, enquiring after a box that was so long, by so wide, by so deep and smelling peculiarly. Since the first person grilled had never heard of naphthalene, there seemed no point in complicating the issue. "Smelling peculiarly" seemed the best general description she could offer them, and if you go and poke your nose into your own storeboxes, I am sure you will agree.

The whole concrete "cop-shop" vibrated to the shaking of heads. Doubtless, men in white coats were even given serious thought. But, though my wife persisted in her interrogation, the box had apparently never set hinge across the threshold.

By and by Christmas came and we gave the environs a rest for a fortnight by going "home" to Britain. The first thing my wife did when she arrived back in January at a police station full of apprehensive officials was to resume the search for the missing box. The borrower assured us for the twentieth time that it had been dutifully delivered. It just had to be somewhere among the mass of paper and misspelt Finnish terms in the local "cop-shop".

It was. In a cupboard it was found lurking among a ton of pink and yellow forms. Smelling mysteriously of naphthalene and dried hawkmoth bodies, it was brought before the Commissar.

"Ah, yes", he said, "I've seen *that* box before. In fact, I myself had it put safely away in that cupboard."

My wife was effusive in her thanks (after all, what else can one do when faced with the boss?)

The Commissar shifted uncomfortably in his seat. "Actually", he confessed, "... actually, it wasn't that. We weren't aware of which crime, but were certain the box was evidence."

Leigh Plester (2968)

ITALIAN BUTTERFLIES IN AUGUST, 1973

This was the second time I had visited Italy in August and although I collected a few specimens there later in the month four years ago, I was able to concentrate on obtaining specimens which had eluded me before.

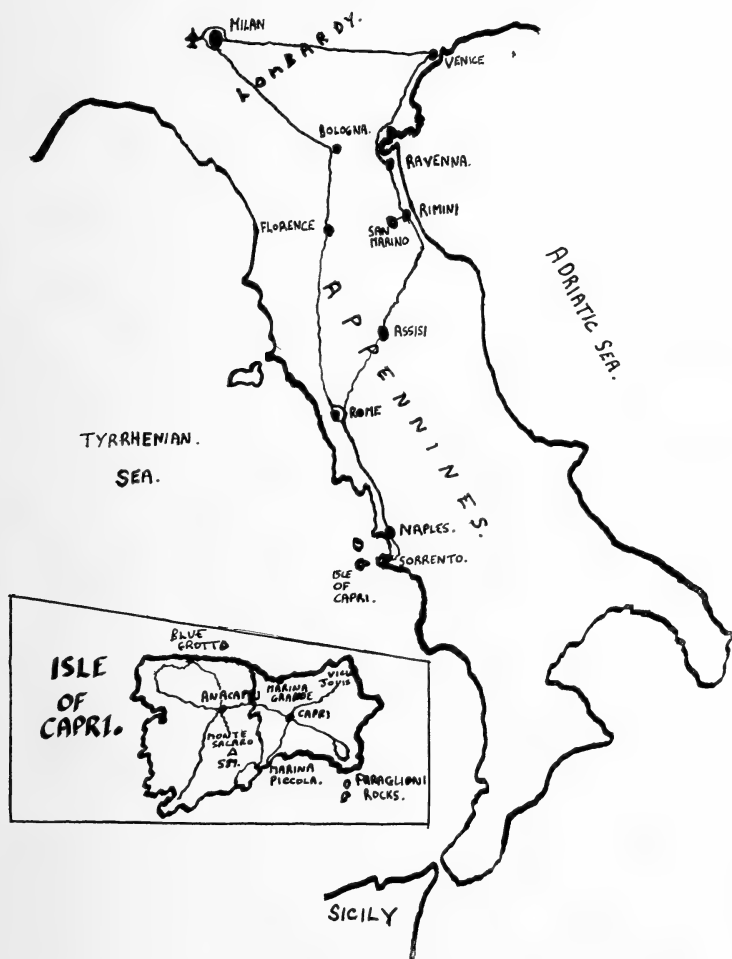
We left England in pouring rain and arrived in Milan in hazy sunshine. The atmosphere was thundery and many butterflies were flying around the airport notably the Small White, *Pieris rapae* L., and the Southern Small White, *Pieris mannii* Mayer. About 30 km. along the motorway, we stopped for lunch at Pregnana Milanese on the outskirts of Milan. The area was of scruffy vegetation interspersed with lucerne fields. The garden of the Motel was lined with cypress trees where many Gipsy Moths, *Lymantria dispar* L., were flying. Lunch over, I hurried up the road to a large field. Here, there were a few Swallowtails, *Papilio machaon* L., Pale Clouded Yellows *Colias hyale* L. but my attention was struck by a flash of copper colouring. After a long chase it proved to be the Large Copper, *Lycaena dispar* ssp. *rutilus* Werneberg. It was a large female and measured 45 mm. across from wing tip to wing tip. I searched the field but there were no more to be found but I also caught Small Copper, *Lycaena phlaeas* L., Common Blue, *Polyommatus icarus* Rott. and Large Skipper, *Ochlodes venatus* Turati and a few southern forms of the Clouded Border Moth *Lomasipilis marginata* L.,

We drove across the Plain of Lombardy which was very marshy to Bazzano near Bologna where the flat country ended and the foothills of the Etruscan Apennines began. We followed the autostrada to Florence where we spent the night. The following morning was spent in Florence and I paid a visit to the Bobolli gardens. There were few butterflies but I recorded a worn Bath White, *Pontia daplidice* L., Long tailed blues, *Lampides boeticus* L., Small Heath, *Coenonympha pamphilus* L. and *P. icarus* which were flying on an unkempt bank.

In the afternoon, we headed towards Rome and, on an autostrada stop about 200 kms. from Florence, I found a few specimens flying in the heat of the afternoon. These were Lang's short tailed blue, *Syntarucus pirithous* L., Spotted Fritillary, *Melitaea didyma* Esp. and *C. pamphilus*. *M. didyma* was newly emerged and the few males which were flying were unusually difficult to catch. The Autostrada del Sol continued south to Sicily and we joined the vast ring road which encircles Rome. The hotel was on the outskirts of Rome and next day I trekked across some agricultural land where I noted a Mallow Skipper, *Carcharodus alceae* Esp., *M. didyma*, *P. daplidice*, *P.*

icarus and a Feathered Footman moth, *Coscinia striata* L. I found a valley which was burned of scrub but further down it was untouched. The area looked unusual, being flat bottomed, steep sided and about $\frac{1}{4}$ km. across. The sides were covered with broom in places and the sunbaked parts were bare earth. On the valley floor itself, the vegetation was far more lush. The varieties of habitat produced a number of different species within a comparatively small area. As I entered the valley, there were large numbers of *L. phlaeas* f. *elea* Fab., *P. icarus* and the silver studded blue, *Plebejus argus* Linn., settled on some Traveller's Joy; *P. argus* being much smaller than British examples. Further down the valley, I netted a newly emerged Lesser Fiery Copper, *Thersamonia thersamon* Esp., which had faster flying habits than *L. phlaeas*. This male specimen also acquired a violet sheen on the upper surface of the hindwings. I beat my way up on to the valley sides and found there were a number of Oberthur's Grizzled Skipper, *Pyrgus amoricus* Oberthur, Meadow Brown, *Maniola jurtina* L., Southern Gatekeeper, *Pyronia cecilia* Val. and *P. argus*. The males of *P. cecilia* were very much rarer than the females, perhaps showing a tendency of a prolonged emergence earlier in the year. On the valley floor, there were a few Clouded Yellows, *Colias crocea* Geoff., some f. *helice*, *P. rapae* and also a colony of *M. didyma* where the specimens had emerged earlier than those I had found further north. I crossed a small stream and found on the other side *P. amoricus* and the Mediterranean Skipper, *Gegenes nostradamus* Fab., which I was pleased to take as I could compare them with *G. pumilio* which I had caught the previous year in Greece. The habits of this species appeared to be the same, flying in full sun over bare ground. Amongst a thicket of broom were flying *L. boeticus* and I managed to see females depositing eggs on the flowers. The valley became impassable and, by noon, it became rather hot so I returned to the hotel gardens where I watched a male *Gonepteryx cleopatra* L. fly around.

The following day was spent travelling south to Naples and onwards to the Isle of Capri. We had a short autostrada stop near Monte Cassino at a restaurant situated near a border of a corn field where there was a considerable area of rough ground. Here was flying the Baton Blue, *Philotes baton baton* Bergstr., *M. didyma* and the Vestal moth, *Rhodometra sacraria* L. Further south we skirted the suburbs of Naples and followed the coast of the Bay of Naples to Sorrento, although not much scenery was visible owing to factory smoke and heat haze. Towards Sorrento, the mountains yielded fresher air and a few Scarce Swallowtails, *Iphiclides podalirius* L. were dancing around the Eucalyptus trees. In Sorrento, there were also *G. cleopatra*, *P. mannii* and *L. boeticus*. The boat trip to Capri takes about 40 minutes and by the time we arrived there it was evening. The island has many paths so one can reach almost anywhere within a short time. The terrain is difficult as it is a huge limestone rock in some places rising vertically out of the sea. The island is saddle-shaped being dominated by Mount Solarno, 560 metres above sea level. I covered nearly the whole



island during the week's stay there. The first walk was to the Villa Jovis on the eastern extremity of the island. The path is steep and winds through the boulders and broom to the summit. Amongst the broom were flying the Tree Grayling, *Hipparchia statilinus* Huf., Wall Brown, *Lasiommata megera* L., *P. cecilia*, *P. mannii*, *P. machaon* and *C. alceae*. There were a few *M. jurtina* f. *hispulla* Esp. some being transitional to *M. j. jurtina*. One *P. megera* had a bleached patch on all four wings. Amongst the ruins where the Emperor Tiberius lived, there were also *P. daphidice*, some of which were depositing eggs; also an occasional Speckled Wood, *Parage aegeria aegeria* L., which settled in the shade of the Oleanders together with some Gypsy Moths. Most of these Speckled Woods were of a form transitional to *P. a. tircis* Butler.

On the south-eastern point of the island, near the famous Faraglioni rocks, were large numbers of *H. statilinus* and a few *L. boeticus*, *P. cecilia* and the occasional female *G. cleopatra*. I caught a battered Woodland Grayling, *Hipparchia fagi* Scop. on a pine tree trunk in a small wood surrounded by a horizon of boulders, the Mediterranean pines quivering in the afternoon heat amidst the constant roar of many Cicadas.

The western side of the island is much higher and the easiest way of getting there is by bus up a steep, narrow, twisting road. The species up there were similar but I caught a Grayling whose identity is not certain. It is either *Hipparchia semele* f. *cadmus* Fruh. or *H. aristaeus*. Probably neither of these species have been recorded from this area before. It is a male and resembles *H. aristaeus* much more closely. We ascended Mount Solarno by the chair lift, intending to walk down. As one rises the vegetation becomes less and less and, at the top, there is virtually bare rock as there are no streams on the island. Butterflies were nevertheless common, similar to the species on the eastern side of the island. Descending on foot, searching for a path reputed to be there according to the guide books, we had to beat our way through layers of broom, followed by bracken mixed with brambles. The path eventually materialized and, flying in the shade, were Holly Blues, *Celastrina argiolus* L., *H. fagi*, *P. aegeria* and *L. megera*. Further along a few Southern White Admirals, *Limenitis reducta* Staud. were gliding around some brambles.

In contrast to the last arduous excursion, we travelled by hydrofoil back to the mainland at Sorrento to catch a country bus into the surrounding hills to visit some friends at a village called St. Agata. The buses were infrequent and when one eventually arrived we had a dusty ride through the narrow roads with their sharp bends. After lunch, I decided to look for butterflies on the terraced hill slopes. The air was much fresher at this altitude. Flying over the long, dry grass, were *P. machaon*, *P. daplidice*, *M. didyma*, *H. statilinus*, *H. fagi*, *M. jurtina*, *P. cecilia*, *L. megera*, *C. pamphilus*, *C. alceae* and a Feathered Footman moth, *M. jurtina* was of the normal form, unlike the Capri specimens. I also netted a specimen of the Rosy Grizzled Skipper, *Pyrgus onopordi* Rambur. Before finally leaving the island, I found the Southern Comma *Polygonia egea* Cramer, *P. mannii* larvae and several Humming Bird Hawk Moths, *Macroglossum stellatarum* L.

On our way to Assisi, we had a heavy shower on the autostrada near Rome. We turned off into the hills where we stopped in an area greatly resembling the Wye valley in Monmouthshire. The species flying along a dry stream bed behind a cafe were Wood White, *Leptidea sinapis* L., Comma, *Polygonia c-album* L., Great Banded Grayling, *Brintesia circe* Fab, *L. reducta* and a Jersey Tiger moth, *Euplagia quadripunctaria* Poda. We followed the road up to Assisi which is situated on the sides of a large flat bottomed valley. The weather was more like a fine day in England and, in the morning, I decided to walk into the country. The meadows were

filled with thousands of blues being mostly *P. icarus* but *S. pirithous* and *L. boeticus* were also common. Also I found amongst the Olive groves Sooty Copper, *Heodes tityrus* Poda, Knapweed Fritillary, *Melitaea phoebe* Schiff, *M. didyma* and the occasional *C. crocea*, *L. megera*, *C. alceae* and *P. amoricanus*. There were also a few large Wall Brown, *Lasiommata maera* and *P. egea* which showed a marked preference to Lucerne fields and Buddleia bushes rather than inhabiting bare stone walls of buildings, the habit of the species further south. The only whites I found were *P. brassicae* and *P. rapae*. Although on my previous visit the Short Tailed Blue, *Everes argiades* Pallas was very common I failed to find it at all.

We left Assisi in the afternoon and travelled through the hills to the east coast plains and there we followed the Autostrada to Rimini where we spent the night. In the morning, the destination was San Marino which is a small Republic perched on top of a rock 660 m. high. I climbed up to the castles on top where bare rock structures predominate with, short steep grass banks between the cliffs which I approached by walking through a wooded slope where there were *P. a. aegeria*, *L. maera* and *H. statilinus* f. *maritima* Rostagno. I climbed down a path on to one of the banks where many butterflies were flying. These included Purple-shot Copper, *Heodes alciphron gordius* Sulzer, *H. statilinus*, *P. cecilia*, *L. megera*, *L. maera*, *M. jurtina* and the occasional *I. podalirius*, *P. rapae*, *P. icarus* and a few newly emerged male Chalk Hill Blues, *Lysandra coridon* Poda.

The following afternoon we travelled northwards into the Po delta region. We stopped near Ravenna and in a ditch were flying *L. dispar rutilus* which was actually common. The males were much more plentiful than the females and the size varied a great deal. I could not conclude whether this species had had an exceptionally favourable year or whether it is always common in this area. Also flying with the Large Copper were *M. phoebe*, *P. icarus*, *C. pamphilus* and *C. alceae*. We continued to Venice passing the large lagoons and oil refineries until we reached the hotel on the mainland. Whilst walking around Venice, I saw *P. rapae*, *P. egea* and a Red Admiral, *Vanessa atalanta* L. In the afternoon, I searched for butterflies in the fields near the hotel. These were mainly of Maize and Lucerne. Also, there were birch and poplar woods. The species I recorded were *P. rapae*, *C. crocea*, *P. a. aegeria*, *C. pamphilus*, *M. jurtina*, *P. icarus*, *C. alceae* and an abundance of *O. venatus*. There were also a few Gypsy Moths.

The final day was spent on the homeward journey and, on the way to Milan, I saw *P. machaon*, *I. podalirius*, *C. hyale* and *P. rapae* at the side of the Autostrada. Arriving at the Airport, we continued our journey back to England.

G. R. Smith (4950)

HAVE YOU HEARD A DRONE ASSEMBLY?

No, I'm not asking if you have *seen* one. Because until June 1973 few people in these islands are recorded as having done so. But a very considerable number of naturalists and beekeepers have *heard* them. When? Usually on a bright sunny day, sounding like a swarm of bees far overhead, in a direction that is not easy to place, at least until, by cupping your hands to your ears, you become attuned to listening to it. Many of us, having heard it but failed to see anything, have probably dismissed the idea that bees really are responsible, and thought no more about it.

WHAT IS A DRONE ASSEMBLY? It is how we describe a place where drone honeybees congregate, usually between 11.00 and 17.00 hr. BST, sometimes considerably later on suitable days in summer. On still days the bees may be very high up—30-50 metres (100-160 ft.) and out of sight to most people, on windy days 15-30 metres (50-100 ft.) and unless you have Polaroid sunglasses probably still out of sight, but on very windy days they descend even to head height and are easily visible. On overcast days bees are fewer yet still they come to the favoured places.

HOW DOES ONE RECOGNISE THEM? By their sound first, and secondly by throwing a small pebble high into the air and looking to see if any drones chase it down on its return trajectory. If you know the orchestra of an apairy when a multitude of drones are on the wing, you have it; well an assembly sounds like that but far off and more mellow, without the shriller pitch of worker bees. If bees are visiting flowers round about you, or have a flightline close by, you may hear them too, but at a clearly different level.

Then again, you may be hearing flying insects like dragonflies, beetles and a multitude of flies and gnats. These are easily seen and not hard to identify with glasses, nor do they as a rule fly as fast or as high as drones. To anyone with an ear for music, or a naturalist who knows what to listen for, they are distinct. That observant naturalist of old, Gilbert White, curate at Selbourne in Hampshire, makes reference to what was clearly a drone assembly (though he does not use that expression) in his journal, now in the British Museum. I quote from *Gilbert White's Journals*, Edited by Walter Johnson (Routledge & Kegan Paul Ltd., 1970):

9th July 1779: "A surprizing humming of bees all over the common, tho' none can be seen! This is frequently the case in hot weather."

Again, the entry of 1st July 1792 reads: "There is a natural occurrence to be met with upon the highest part of our down in hot summer days, which always amuses me much, without giving me any satisfaction with respect to the cause of it; and that is a loud audible humming of bees in the air, tho' not one insect is to be seen. This sound is to be heard distinctly the whole common through, from the Money-dells, to Mr. White's avenue-gate (at Newton). Any person would suppose that a large swarm of bees was in

motion, and playing about over his head. This noise was heard last week on June 28th."

I am indebted to Mr. H. W. Crowson, of Selborne, for guiding me to this spot to witness the phenomenon, 194 years after Gilbert White's first entry. Mr. Crowson had heard the assembly on many previous occasions. On July 4th 1973, a hot sunny day, we set off for this location high up on the down. Although we could hear it from afar—perhaps $\frac{1}{2}$ km. ($\frac{1}{3}$ mile)—the assembly proved not to be where he had seen it the week before. Yet we could hear it clearly away to the south, where we eventually traced it, about 200 metres away, high above an overgrown clearing amidst tall trees, but still on the Common.

It is one of the remarkable things about drone assemblies that they often (but not always) recur in the same place year after year. From day to day the focal centre may move a short distance, as at Selborne, according to the direction and strength of the prevailing wind; single bees can be heard at the focal area, which they seem to memorise closely, winging their way to or from the current day's assembly, where much larger numbers of bees can be listened to in harmonious chorus high aloft.

Because of the interest now being shown in bee breeding matters, including mating behaviour, Port Erin, in the Isle of Man was chosen as the location of the 1973 Conference of BIBBA. For there, on the Rowany Golf Course, it has been my privilege for the past seven years to witness a drone assembly centred above the highest green of the course on sunny days throughout the summer. Parties from the Conference visited the course daily to witness the happening, and to observe how its location varied with wind coming from different quarters. The patience of the Club Manager, let alone the golfers, must have been sorely tried by the daily invasion of beekeepers, and we owe them our many apologies, and thanks for their forbearance. They must have been as intrigued by the antics, and equipment, of the bee-breeding enthusiasts, as the latter were of the happening they were witnessing for the first time.

Distinguished guest of the Conference was Professor Friedl Ruttner, of Frankfurt University, who had found it difficult to credit the idea that our bees formed no drone assemblies, as stated in books, since the behaviour was so widespread amongst bees of all races and must surely be a general phenomenon. We were happy to escort him to the Course within a few minutes of his arrival at the hotel, and his delight was wonderful to behold! The drones performed exactly on cue, confirming his scepticism of dogmatic English authors!

I have seen and heard several other drone assemblies in Britain, Ireland and the Isle of Man in past years, and there must be many more known to our readers. It would be helpful to visit and map as many of these as possible, and to learn more about their aspect, formation, meteorological characteristics, periodicity, and kind of bee involved.

Studies are in hand to elucidate the why's and wherefore's of such places.

The matter is of interest to all naturalists, and of practical value to both beekeepers and queen propagators. How should one site or avoid siting one's mating apiaries, how large does a monostain area need to be made, and what sorts of territory give anyone relying on natural mating the most control over the assembling drone population? When do assemblies form, or break up? Are there any physicists, meteorologists or naturalists prepared to collect data for us, to broaden our picture of the matter?

While the subject is of particular interest to beekeepers, drone assemblies are much more likely to be found by walkers and naturalists upon hills and around marshes than by beekeepers near their hives. For this reason I would like to appeal to any of my former AES and other lepidopterist friends who feel they may have heard such a humming in any of their collecting grounds, to let me or George Sommerville have details, as far as they can recall them. And if they can, revisit the sites this coming summer, to report on the date and location with more precision. The drones are usually so high that they cannot be heard in windy weather if there are noises of aircraft or traffic audible, and the assemblies may occur several miles from any known hives or wild colonies of bees, for example in hill, woodland or mountain areas. It is these sites well away from human habitation that are least likely to be known except to shepherds, gamekeepers and foresters—and townsfolk seeking refuge from city noise. It is a country problem, but one which the non-countryman who loves the country can do much to solve.

Because of their knowledge of so many kinds of insect, entomologists are likely to discount the idea of drone honeybees being the cause of such a humming in the air. The Editor of *Gilbert White's Journals*, Walter Johnson, made such a guess, his note on the 1779 entry reading: "Believed to be caused by minute hymenopterous insects", with the 1792 entry reading more definitely: "Caused by minute diptera and hymenoptera". While there are insects of many orders among and near the trees on Selborne Common, each emitting its own humming melody, they are clearly not the sounds heard by Gilbert White "playing about over his head"—only drones seem to play about, particularly when in comet formation they follow a queen bee.

It would interest me to know of other published references to this phenomenon, little studied in Britain and Ireland in recent years, yet well known to skeppist beekeepers last century. I am very keen to summarise our knowledge on the subject for a technical article in preparation.

There are clearly two distinct modes of mating in honeybees: (1) *Local Mating Behaviour*, which will tend to optimise inbreeding within an apiary, and (2) *Assembly Mating Behaviour*, which would seem to optimise outcrossing. Both occur in the native strains of these Isles, the first being more important in dull or rainy seasons as well as early in the season before drone assemblies have been set up. The sound of droning heard above an apiary in Local Mating is very reminiscent of the sound at a Drone Assem-

bly which is distant from bee hives, but its strength tends to diminish as the distant assembly is set up.

It is my experience that native strains, and particularly superseding local strains, make quicker local matings than do either swarming strains or bees from Mediterranean and more continental climates, which seem to wait for good weather and assembly formation, but more evidence is wanted to show under what conditions this happens, and how the one behaviour ousts the other.

These questions, and lots more, are the subject of a BIBBA Study Project. If you can contribute in any way, you may care to write to the Project Convener, George Sommerville, 10 Harrowden Lane, Finedon, Wellingborough, Northants, England, who will be pleased to correspond with you on this topic, or to me at Whitegates, Thulston, Derby DE7 3EW.

Much has been learnt in recent years about drone assemblies, but much more still awaits discovery.

Have *you* heard a drone assembly anywhere?

Beowulf A. Cooper (19)

The above is reprinted, with permission, and additions, from BIBBA News, No. 14, pp. 29-32 (December 1973).

(It is a pleasure to again have an article from the pen of our former Editor (1936-47) and we congratulate him on his appointment as Director of the British Isles Bee Breeders' Association. Any information we can give him will be most welcome and useful and should be sent to the address quoted above—Ed.)

FURTHER NOTES ON CULTURING THE EGGS OF BUSH CRICKETS OF THE GENUS *Platycleis* (ORTHOPTERA, TETTIGONIIDAE)

In a past issue of the A.E.S. Bulletin (Samways, 1973) I suggested that Mr. David Tyler's larvae cage (Tyler, 1973) might be used as a labour-saving means of keeping *Platycleis* spp. eggs moist. Once the cage had been prepared and the animals introduced little maintenance would then be required. The floor of the cage would be kept moist by capillary action through the sand, thus overcoming the difficult problem of preventing the eggs from drying out. The cage has already been described and figured in Tyler (1973).

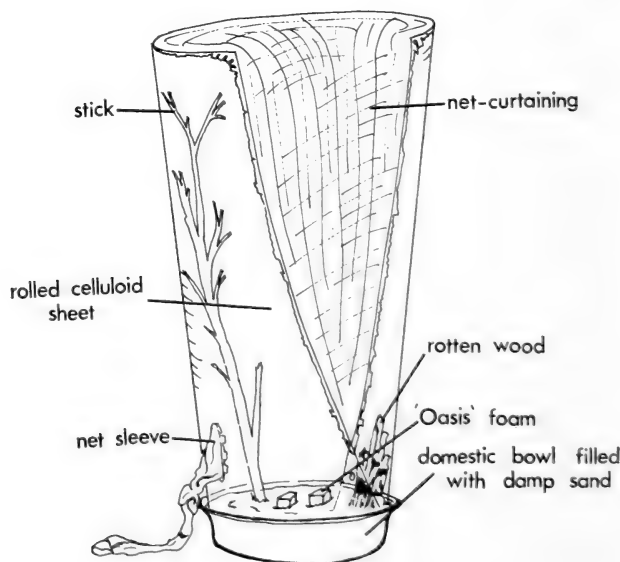
Since writing that article I have experimented with various types of oviposition sites and cage designs for culturing *Platycleis* spp. Damp, rotten wood and especially "Oasis" foam were preferred over cotton-wool, cellulose wadding, polyurethane foam, polystyrene, concentric columns of blotting paper, sphagnum peat, top soil and sand as egg laying sites. "Oasis" is a green-coloured, crumbly substance that is sold in blocks as a foundation in vases for bearing cut flower stems.

Keeping in mind the principles of Mr. Tyler's cage, another cage was designed, specifically for culturing *Platycleis* spp. It consisted, in part, of a domestic washing-up bowl filled with damp sand. A three-foot square

sheet of celluloid (obtainable from D.I.Y. shops) was rolled into a cylinder and then the overlapping edges were parted at the top of the cylinder; this increased the overlap at the bottom so that the cylinder had now become a frustrum of an inverted cone with a large V-shaped opening at the front. The overlapping region was secured with a short bolt and nut, and some strong glue (Evostick). The open front and top were covered with fine net-curtaining. The area of celluloid was about equal to the area of mesh. A hole of 10 cm. diameter was cut near the base of the celluloid cone and a net-curtaining sleeve was glued over this hole. The base of the cone was then sunk into the sand, to a depth of about 8 cm., around the internal periphery of the bowl. Sticks were introduced to give the insects purchase. Food was supplied in a small plastic dish; pieces of rotten wood and moistened "Oasis" foam were partly sunk into the sand, so keeping them moist.

This cage was large and airy enough for condensation not to form a surface-tension trap on the walls for young nymphs. Under the conditions in the cage the males sang readily and the females oviposited quite freely. The fact that the whole of the floor of the cage was suitable for egg-laying meant that few eggs were lost. The ones that were not laid in the wood or foam were laid in the sand. Cadavers and old food could be removed *via* the sleeve without the insects jumping out.

In 1973, most of the nymphs that hatched (from eggs laid in 1972) were those that had been kept on damp kitchen towelling (cotton-wool tends to cause the nymphs to lose their legs) in Petri dishes over winter. These eggs



had been scattered on the floor of the original stock-cages, and if not salvaged these eggs would probably have died from desiccation. It became clear in 1973 that sand was not such a preferred oviposition medium as was previously thought (Samways, 1973). Only a few nymphs emerged from the sand pots that were used in 1972, and searching of these revealed that only a few eggs were present. Thus, it appeared that few eggs had been laid there in the first place (as opposed to high mortality amongst a large batch of eggs).

As this year showed that "Oasis" and rotten wood were the most suitable oviposition sites, and it was known from the 1973 hatchings that *Platycleis* spp. overwintered well, as eggs, on damp kitchen paper, it was thought that maximum hatching would result if the eggs were removed from the "Oasis" and wood (as well as the few eggs from the sand surrounding these two sites) and incubating them in Petri dishes lined with kitchen paper. Leaving the eggs *in situ* might have resulted in unnecessary deaths of the pronymphs before they reached the open air at hatching time. It was not difficult to transfer the eggs, though it was laborious. The eggs are, at present, being cultured in a domestic refrigerator maintained at 2°C (to allow the eggs to undergo diapause), after having been kept at 23-30°C for 30-90 days, depending on when they were laid. Hartley and Warne (1972) discuss in some detail the culturing of western European bush cricket eggs.

In conclusion: the adults of *Platycleis* spp. are best kept in a large cage with a side-sleeve which allows food etc. to be introduced but prevents the insects jumping out. The whole of the base of the cage should be covered with a thick layer of damp sand, and into this should be partially sunk some moistened "Oasis" blocks or rotten wood. The adults are most likely to lay their eggs at night; if it is thought that the females are not coming down (in the day they are at the top of the cage) to lay, a light bulb can be placed at the bottom, but outside the cage and not too near. After at least 30 days the eggs may be removed from the foam or wood and cultured below 10°C but not as low as freezing point. After at least 60 days in this condition they may be transferred back to room temperature (Hartley and Warne, 1972). The nymphs, on hatching, can then be transferred back to the large cages to complete their growth.

Michael J. Samways (4927)

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EREBIA EPHIPHRON (KNOCH) IN WESTERN LAKELAND

This species has always interested me greatly, mainly due to the ignorance surrounding its modern distribution in England. Living some fifteen kilometres from the edge of the Lake District, it would seem an easy task to study this species, but at times it can be a most elusive creature. I have attempted to get to grips with this species several times, always camping in or near its breeding grounds. Up to this last season I was not very successful, so what follows is an account of how to go about searching for this species.

Over many years I have searched all the old Cumbrian collections for localities, but met with only a very general response of "Keswick" or "Westmorland". On reference the standard text-books, even those just recently published, merely echo the old classics, namely Red Screes, Langdale Pikes and Gable Hill (=Great Gable). The two former localities do still support *E. epiphron*, but I have yet to study these localities in detail. Great Gable can be very misleading to a stranger to Lakeland, for the mountain itself supports no colonies, on its mainly precipitous scree slopes. What is meant is the Great Gable area, which is quite good advice, but it is a large area to cover. Thus do not try to climb 740 metres to the summit of Gable and expect to see *E. epiphron*. In a normal season the flight period is from the end of June to the end of July, but this can change by up to three weeks, due to seasonal vagaries.

The reason that this species is seldom seen by visiting entomologists is the traditional weather of the Lakes, namely rain. Unless one has sunlight, no sign will be seen of *E. epiphron*, for it will not fly and hides in deep grass tussocks. Thus ideally one must camp in the area, and so take advantage of every opportunity. A period of two weeks is a sensible period of time to remain in the area, for sunlight can be a rare phenomenon in the Lake District. The actual terrain is not to be treated lightly, the weather can change very rapidly, and lives have been lost through disregard of this fact. So, sensible precautions are to wear suitable clothing and strong boots.

This last season my friend, Mr. E. Gilhooley and I camped at Sty Head Tarn (Grid reference NY 221099). This is where I had camped on three previous occasions with varying degrees of success, for it is at a height of 500 metres. We spent eight days there, from July 4th to the 13th. We were lucky in that we had three sunny days with patches of blue sky! A good illustration of the weather conditions is that after we had broken camp, a mist settled which remained at 280 metres for three weeks!

During this time we plotted the exact position of the two main colonies, and several smaller ones. The most noticeable factor concerning the colonies was that they had clearly defined edges, and very few individuals were seen below the 625 metre contour. That is 30 metres higher than the quoted figure of many text-books. The colonies were situated in areas where there

were many moist hollows and rock knolls, and any such ground over 625 metres in Lakeland is open to investigation but many seemingly suitable areas are devoid of *E. epiphron*. A practical example of this is the Seathwaite Fell-Sprinkling Tarn ridge and its neighbouring Allen Craggs ridge. Both look very similar, and are only about a kilometre apart, running parallel to each other. But *E. epiphron* occurs only on the Seathwaite Fell ridge; the cause of this being open to further investigation. To anyone sufficiently interested I could loan slides of the actual locality type. The flora list for the area needs an expert botanist, but includes mainly *Nardus stricta* Linn. (Mat Grass) and other grasses together with sedges. The adults were seen to feed on *Thymus serpyllum* Linn. (Wild Thyme), and *Potentilla tormentilla* Neck. (Tormentil), which grow among the grasses. But the opportunities for feeding are so few and far between, that I suggest that they survive mainly on body reserves. They were seen to imbibe large quantities of water from the grasses (for due to the high humidity there are virtually always droplets of water on them). On average the adults flew forty cm. above the ground, possibly to prevent being blown away from the main colony. They flew readily in sunlight, and during sustained periods of sunlight kept on flying if the sun was momentarily obscured by cloud.

Several males and four females were taken, the former are now being used in a comparative study of the two colonies, using morphological and other taxonomic features. The females provided 70 ova, and the resultant larvae are being overwintered, and so far some are successful. A rough count was taken of one colony, and on just skirting the edge, a total of forty eight specimens were seen, and overall outnumbered *Coenonympha pamphilus* L. (Small Heath), by twenty to one. The *C. pamphilus* were very interesting in their seemingly small size, and again more work must be done on this study. The only other species of note were *Parasemia plantaginis* L. (Wood Tiger) and *Colostygia pectinataria* Knoch (Green Carpet).

To the budding "epiphron hunter", I can only repeat the advice of other entomologists, namely collect if one must, but in moderation. Also particularly in this species, do not keep going to the same old localities; seek new ground and do something worthwhile. Overall I do not consider *E. epiphron* to be in any danger of extinction in the Lake District, due to that great protector of the species, "Lake District weather"!

Keith Porter (4505)

ON THE DISTRIBUTION OF FURCULA-BEARING COLLEMBOLA IN SOIL

The Order Collembola is characterised by insects which bear a furcula or spring (when present), from which the popular name of "springtails" is derived. At rest the furcula is kept under the body, held by the retinaculum, but it can be released and forced downwards causing the animal to jump.

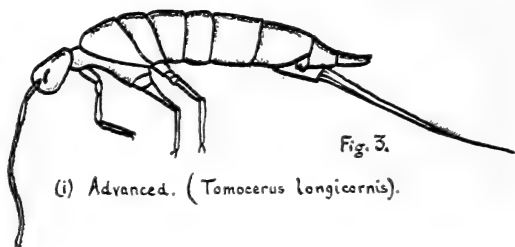


Fig. 3.

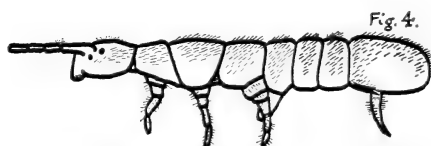
(i) Advanced. (*Tomocerus longicornis*).

Fig. 4.

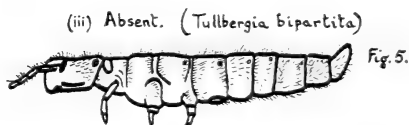
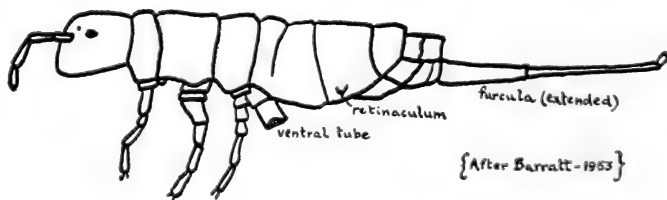
(ii) Reduced. (*Folsomia quadriculata*)(iii) Absent. (*Tullbergia bipartita*)

Fig. 5.

DEGREES OF DEVELOPMENT OF FURCULA



{After Barratt-1953}

Fig. 1 A typical Arthropleonid Collembola.

Many species of Collembola have a reduced furcula which cannot function normally, and in other species, the furcula is completely absent.

It seems reasonable to suppose that the furcula can only be used effectively when the specimen is near the surface, where the soil is loose and there is room to jump. Species living in deep soils would probably have little use for a springing-organ, and their presence could even be a hindrance to normal movement. The hypothesis which this project attempted to verify was that furcula-bearing Collembola are more likely to be found near the surface of the soil where they can spring successfully, and that species living at greater depths are likely to have a reduced (or undeveloped) furcula, or none at all. It was *not* suggested that the presence/absence of the furcula influenced the distribution of the insects within the

soil, but vice versa—it was proposed that the depth and therefore the density of the soil at which the insects live has resulted in the degree of development of the springing-organ seen today. As far as I am aware, no statistical evidence for this has been forwarded, although the probability of such a situation has been commented on by several workers. Kuhnelt (1950) states that the Collembola with long legs and furculae are found in the surface litter, that soil inhabiting species have smaller organs, and that the types lower down have furculae which are completely functionless or missing altogether. Because the purpose of the project was solely to examine the relationship between soil depth and furcula development, other factors such as soil type, pH, temperature variance etc. can be generally ignored (although readings were in fact taken).

Technique

Through a cross-section of a sunken compost-heap, four levels of depth, 20 centimetres apart, were measured. From each level, four 250 cc. samples of soil were extracted. Two samples from each level were heated in a Berlese funnel, the downward moving creatures being collected in alcohol. The other two samples were thoroughly broken up and mixed in strong Sodium Chloride solution, and the creatures floating up were collected at the surface. The Collembola from all of the samples from each level were combined, and then split up into groups, as follows:—

- (1) Specimens with a well developed furcula.
- (2) Specimens with a reduced furcula.
- (3) Specimens with no furcula.

A certain amount of subjectivity was inevitably present when deciding into which of the three categories a specimen belonged but, generally, a well developed furcula is described as a fully functional springing organ, which, when held at rest ventrally, usually reaches the ventral tube. A reduced furcula is smaller, not reaching the ventral tube, and it may not be functional. Ideally, the Collembola should be categorised by their springing ability, i.e. Collembola with functionless furculae being grouped with those with no springing organs, but this would involve the observation of live animals and was beyond the scope of the present project.

Results

From all the levels, a total of 1,386 specimens were removed. These were placed in the three categories as follows:

Table 1. *Total Collembola of each type, at each level.*

	DEPTH			
	S	S-1	S-2	S-3
Group 1	486	301	29	18
Group 2	22	47	15	21
Group 3	186	162	46	53
Total:	694	510	90	92

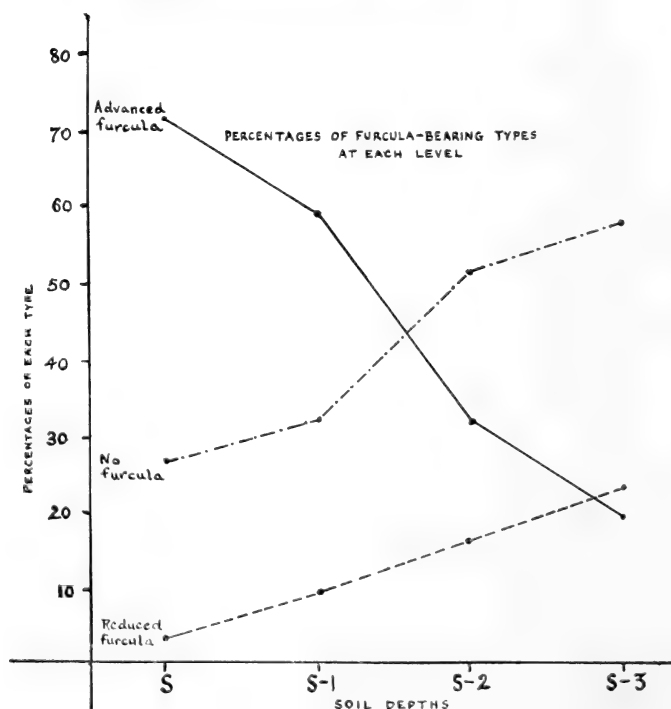
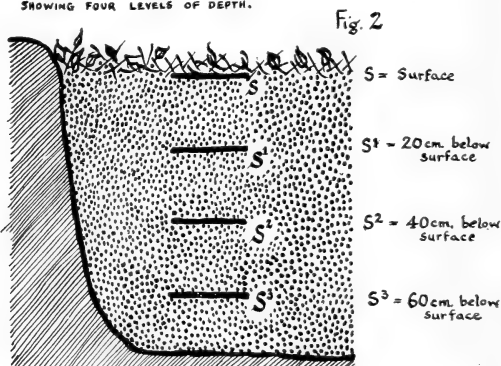
These results were plotted as Soil Depth versus Number of Collembola of Each Type. However, because the total number of Collembola found

decreased sharply with depth, the table and graph were redrawn, showing the *percentage* of each type recorded.

Table 2. *Percentage of Collembola of each type, at each level.*

	DEPTH			
	S	S-1	S-2	S-3
Group 1	71.2	59.09	32.2	19.6
Group 2	3.3	9.2	16.6	22.8
Group 3	26.5	31.79	51.2	57.6
Total	100	100	100	100

CROSS SECTION THROUGH SUNKEN COMPOST HEAP
SHOWING FOUR LEVELS OF DEPTH.



This graph shows the total results of the project. As can be seen, advanced-furcula bearing specimens were found most commonly at the surface where they formed over 70% of the total found at that level. This number decreased markedly with depth, until at S-3 (60 cm. below the surface) only 15% of the specimens had advanced furculae. Specimens with reduced furculae were relatively few in number throughout, but, as would be expected if the hypothesis is correct, they increased steadily with depth, from forming only 3.5% of the total at the surface, to 23% of the total at S-3. Specimens with no furcula at all also showed a steady increase with depth (as would be expected), from 27% at the surface to 58% at S-3.

Thus it can be seen that the results obtained tend to support the original hypothesis, in this individual case. The crude structure of the project can now be improved and extended to investigate whether the theory still holds in other habitats and under different conditions.

(This is an abbreviated account of an academic project carried out some time ago. Should anybody require the complete study, I will be glad to lend it to them on request.)

Graham M. Bathe (4225)

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OBSERVATIONS ON A NEW FOREST BURNET COLONY

On July 18th last year I discovered a colony of Six Spot Burnets (*Zygaena filipendulae*, L.) in the Lyndhurst area of the New Forest. A total of 84 cocoons were found on a variety of plant stems at an average height of 20 cms above ground level. The taller and already seeded and dried out grass species appeared to be particularly well favoured as cocoon sites, perhaps because they resembled the cocoons in colour.

What was particularly interesting was that these 84 cocoons were all contained within an area of less than 8 metres by 6 metres, on the immediate roadside, bounded by the flanking fence of an adjacent cattle-grid. I have encountered collections of these Burnet cocoons before, but I can't remember having seen them in comparable numbers and concentrations. They were literally everywhere within this area. The ground was sandy with the usual selection of plant species to be found on the roadside edges of heath land in the New Forest plantations, grasses and small heathland plants such as ling and heather. The surrounding area was flat heathland, well grown with gorse. However, small plants of Bird's Foot Trefoil (*Lotus corniculatus* Linn.) were more numerous here which would seem to explain the strong preference for the chosen area. I found no cocoons outside of this conveniently bounded area, despite a good search, although nine cocoons were counted affixed to various parts of the wooden fence. In

similar conditions within the fence though, in a smaller area on the other side of the road, eleven cocoons were counted.

On the date of discovery of this colony the weather was overcast but dry with sunny intervals and a light breeze. At the time of the first visit, 11.30 a.m., several imagines were seen resting on plants, mostly newly emerged and still near their vacant cocoons (with the characteristic pupa case half out of the hole made by the insect in the top of the cocoon) and all were in fresh condition. At times (especially during sunny intervals, but not invariably so) one or two imagines were seen flying up and down the area, repeatedly "patrolling" it, it would seem, stopping to take nectar from the large purple/pink thistle flowers present on the three plants of this species within this piece of ground. One moth, a male, appeared to be visiting cocoons. He was attracted and seen to settle on the stems of plants, just above both vacant and occupied cocoons, but he didn't stay more than a few moments at each.

Most of the cocoons present were unbroken and therefore I concluded it was early within the emergence period for this colony.

Also of note during this first visit, two larvae of the species were seen, both fat and in the last instar, and both having moved away from the foodplant to spin cocoons, one on a plantain and the other on a thistle. The latter was plagued with seven or eight small yellowish grubs.

By a second, afternoon, visit on the 18th the parasitized larva was still in the same place, covered in the small yellow cocoons of its parasite. The other was not seen. I expect it had moved on and spun a cocoon; I understand that because of the hydrogen cyanide (prussic acid) acquired by these larvae from their foodplant they have few predators.

Similar weather conditions prevailed throughout the period in which I made my observations, although we had a few showers during the first three days after my discovery of the colony. On the 26th I had to conclude my observations. Emergences had continued at a steady rate from the 18th through to this date, by which time almost all the cocoons had been broken out of. Mating pairs of this species were seen during every visit after the 18th July, usually one or two pairs per visit. One partner, usually the male, would be abdomen uppermost as the two partners remained still and abdomens joined on a stem, often the stem on which the cocoon of the female was attached lower down.

Three other cocoons were seen of this species with a small hole in the middle of one side, surrounded by a brown stain, and the pupa inside had been attacked in each case. I would be most interested to hear from anyone who could explain this condition; Is this another form of parasitism and, if so, is the parasite attacking from outside the cocoon, or emerging from it?

Paul Waring (4220J)

BREEDING LASIOMMATA PETROPOLITANA FAB.

In their classic work on the European butterfly fauna Higgins and Riley give English names to non-British species. Whilst these are of limited practical value, the one given to *Lasiommata petropolitana*, that of the "Northern Wall Brown", is especially apt for the species resembles a Wall butterfly (*L. megera* L.) in which the orange-brown ground colour is replaced by darker brown. The butterfly ranges from the Pyrenees through the Alps and Fennoscandia, Russia and northern Siberia to Amurland. Specimens were collected and the F1 generation bred from them in 1973 in Finland, at approximately 61° 30' N. and 24° E., and to these the following descriptions apply.

The insect is not exceedingly common, neither is it markedly rare. As with *L. megera* in Britain, groups of three or four individuals are usually encountered in one place at one time, the butterflies being especially fond of bobbing up and down small boulders, on which they eventually come to rest and against which they are then well camouflaged. This habit is reflected in the specific name of *petropolitana*. The time of flight is indicated in the table.

TABLE

Details of life cycle of *Lasiommata petropolitana* Fab., in Finland at 61° 30' N., 24° E.

First ova laid: 6.6.73

First larva hatched: 13.6.73

First pupa formed: 18.7.73

Last pupa formed: 15.8.73

Flight periods:

Year:	Dates:	Individuals recorded:	Maximum per locality per occasion:
1967	1.6-15.6	28	10
1968	2.6-22.6	18	10
1970	4.6-19.6	35	10
1971	19.6-28.6	11	5
1973	27.5-26.6	127	19

Individuals collected in June 1973 settled down well in cages, covered with butter muslin on all but the shady side which was furnished with black mosquito netting. They were only inactive at night and during prolonged dull periods. Males willingly attempted to pair and females freely provided eggs, laying these in the main on grass stems, particularly the drying stems and heads of cut *Poa annua* L. The ovum is large and pale greenish-white sculptured with many longitudinal keels with transverse connections. It appears to turn darker before hatching, but in fact the shell itself does not change colour.

On hatching, the larva is of an off-white hue with six longitudinal pale brown stripes. Three rows of hairs along the back are black, becoming whitish near the tips. On either side a further single row of hairs and a double row are whitish down their whole length. The head is shining pale brown with approximately sixteen black patches, from each of which arises a single pale hair. The patches on the frons region are less well defined than those laterally and dorsally situated. The mouthparts are

dark brown. Pale brown legs and whitish hind claspers complete the ensemble.

After 24 hours the caterpillar is darker, the front two-thirds appearing green owing to the presence of vegetation in the gut. It has by now eaten its eggshell and commenced to feed on grasses. *Poa annua* was taken, as was a variety of other grasses, including *Agropyron repens* (L.) Beauv. (Couch or Twitch), which the larvae seemed to prefer when offered a choice.

In the second instar the larva is pale green, ornamented laterally with three whitish stripes and two dark green ones. Its hairs are black with whitish tips. The head is of slightly darker green hue than the general ground-colour, and has blackish patches. The legs are now green. It must be emphasised that the green ground colouration is much paler and duller than that of the larva of *Pararge aegeria* L., which was bred at the same time in an adjoining cage.

The colouration of the caterpillar changes little in subsequent instars. Some larvae have indistinct lateral stripes; in others these stripes are well defined. The black patches are lost from the head. A fully grown specimen is about 35 mm. long, feeds at any time of the day or night, and lies along a grass leaf-blade when not feeding. Its anal points are then a prominent feature.

In mid-June the larvae were put outside into a wooden box measuring 80 (length) x 35 x 35 cm., covered with butter muslin and furnished with a slab of turf in which grasses of various kinds were growing. The summer was exceptionally hot and sunny, and the box was covered with a polythene sheet when rain was falling. By mid-July most of the grass had been consumed and the larvae, now measuring around 20-30 mm., were gathered up in small batches and taken indoors, where they began to pupate on July 18th.

The hanging pupa is dull pale green, with the wing cases slightly darker. Whitish lines decorate the keels on the head and thorax. Its length is 13 mm. Pupation generally takes place beneath an over-hanging grass-blade, sometimes on a stem, rarely on the roof of the breeding cage. Grönblom recorded chrysalides of a greyish hue, so the species may pupate in the wild state underneath twigs and the like.

The chrysalis hibernates, presumably—owing to its low situation—covered with a protective layer of snow for most of the winter. Male butterflies appear the following "spring" a few days earlier than the females.

Leigh Plester (2968)

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BREEDING THE BRITISH SWALLOWTAIL (*Papilio machaon* L.)

In August 1972 I obtained, from a friend, 15 Swallowtail larvae about half grown and, feeding them on carrot, I managed to take them through to the chrysalis state.

Hoping for pairings this year, I purchased 50 Fennel, *Foeniculum vulgare* Mill., seedlings (from Worldwide Butterflies) and also obtained Sweet Rocket, *Hesperis matronalis* L., and Valerian from a local nursery. The Fennel seedlings were planted in a small area 2' 2" x 2' 2" and left over winter.

At the beginning of April a framework was built around the Fennel and covered with black nylon netting (the top piece held down by drawing pins, so that flowers and the adult swallowtails could be introduced without difficulty. (When building the cage it must be kept in mind that the Fennel, then only 10" high, would make considerable growth, especially in height, so that allowance must be made for this.)

The pupae were put into an emerging cage during the middle of April (with plenty of sticks to afford the newly hatched Swallowtails good foothold, while drying their wings).

On the 31st May the first Swallowtail pupa began forming up (becoming transparent in appearance). This Swallowtail emerged on the 4th June—a female. On the 6th June, my friend who had given me the larvae, came to the rescue with 2 males. These were placed into the cage (together with a vase of flowers—Valerian and Sweet Rocket) and at 1.40 p.m. that afternoon a pairing was secured, parting taking place at 3.20 p.m. On 7th June two more emerged (male and female) and on 8th June another male and female.

I had acquired a Marsh Hog's Fennel, *Peucedanum palustre* (L.) Moench., plant in a flower-pot which I placed in the cage with the butterflies.

The first Swallowtail laid 18 eggs, all on the Marsh Hog's Fennel, the Fennel, being ignored. As the Marsh Hog's Fennel plant was much smaller in size, and seeing that the female Swallowtail preferred this plant, it was decided to place them in a smaller cage 24" x 18" x 18" so that the Marsh Hog's fennel was about 4" from the top of the cage. (Three more Marsh Hog's fennel plants were obtained.)

9th June	2nd Female had only laid 4 eggs, due to lack of sunshine.
11th June	Male emerged. Many more eggs were now being laid by the 2 females, obviously due to the sunshine.
13th June	Female emerged,
14th June	„ „
16th June	„ „
17th June	Male and female emerged. Another pairing was obtained between 2 p.m. and 2.40 p.m. First eggs hatching, due to the

warm weather, 12 larvae approx. $\frac{1}{16}$ " in length. The eggs had only been laid 11 days prior to hatching.

19th June Now about 45 to 50 eggs plus 18 larvae.

This caused a problem, in so far that there was some danger of the larvae escaping and also that as the larvae ate the plant, there was danger of the eggs dropping. Because of this the larvae and one of the Marsh Hog's fennel plants were removed to a specially constructed larva canister.

21st June 2 more Females emerged.

23rd June Now about 50 larvae.

24th June Another Swallowtail (male) emerged. A pairing took place between 2.10 p.m. until 6.15 p.m.

25th June Female emerged. Two pairings—one from 10 a.m. to 12 noon and another from 1.30 p.m. to 3.00 p.m.

26th June Larvae now number about 60. Many more eggs still being laid.

By the 10th July larvae numbered 95, of which two lots of 30 were given to friends. Feeding the remainder on carrot tops the first larvae pupated on 23rd July. By the first week in August I had a total of 16 pupae.

I would like to hear from other members, if they have had such success breeding *machaon*.

J. Green (4932)

NOTES ON BRAZILIAN LEPIDOPTERA

Thysania agrippina, Cr.

This giant noctuid moth is a frequenter of the damper parts of deep forests where it may be found by day asleep, wings spread flat on a tree trunk where the wavy brown markings of its buff coloured wings blend (in the semi-light) with the striated bark.

Thus at rest, and well camouflaged, *T. agrippina* is not easily detected; it needs a sharp eye to spot it; but after locating one or two specimens, the collector finds himself familiar with its characteristic pose—wings spanned on the bark, pointing upwards and downwards along the tree-trunk. Succeeding specimens are thereafter more readily spotted, and provided the collector's approach is silent and cautious he can get within netting range (assuming he has a long handle of about 5 ft. to his net). But the slightest rustle of undergrowth or crackle of twigs or dead leaves—or even a jerky movement is enough to arouse this moth, and it then "takes off" with startling suddenness. Its flight is directed very swiftly, but erratically, upwards towards the tree-tops; but it soon begins an irregular descent to about 10 ft. above the ground where it dodges about between the trees to settle once more on a tree-trunk about 100 yards away.

Because of its large size and the blue-black underside colouration, this moth has the appearance (when flying in the gloomy and irregularly lighted forest) of a pigeon. Because of the poor visibility and blotchy light, *T.*

agrippina is not easily kept in sight after being disturbed, and in spite of its size is usually lost to view and not found again.

The wing-span of this moth (the largest in the world in terms of wing-span) is usually about 9 inches, but specimens up to 12 inches exist in collections, which I have personally seen.

The beginning of the rainy season, which commences with light intermittent showers, is the time most favoured by *T. agrippina*; and when the forests get too wet and soggy, it disappears.

I have seen many specimens of this moth in the North-east and North, and have caught a few; but although I have searched often and carefully, have never come across *T. agrippina* in other parts of Brazil.

Papilio anchysiades capys, Huber

This handsome tail-less swallow-tail is found in many parts of Brazil. It is fairly common in the humid districts of the North-East, especially in the hills, flying jerkily but swiftly about 6 to 8 ft. above ground usually in the vicinity of citrus plantations.

The caterpillars, which do considerable damage in these plantations, can be found in "packs", huddled tightly together on the trunks or branches of the trees. In this respect they differ from the solitary caterpillar of *P. thoas brasiliensis* R. & J. (also frequently found on citrus trees), which are similar in appearance, but have a more generous splash of white in their colouring during their early instars.

At Garankures, in Pernambuco (2,800 ft.) the butterflies flit and hover over orange trees, poinsettias, bougainvilleas and other flowering trees along the roadsides. Further South, in Minas Gerais at similar altitudes I have watched them among the blooms of high silk-cotton trees. And near Belo Horizonte, in 1962, on a hillside overgrown with cosmos, zinnias, lantana and milkweeds, these swallowtails were rather common. In this delectable area there were also a few *P. thoas brasiliensis*, *P. ploydamas*, L., and *P. scamander grayi*, Boisd; also many genera of Nymphalidae, Hesperidae, Pieridae and others, including some Danaids were evident, enjoying the flowers and the midday sunshine. One very brilliant sunny day, I netted a couple of day-sphinx (*Macroglossa*) and some day-flying Amatid moths. The Arctid, *Utetheisa ornatrix*, L. was present here in numbers.

In the hollows of this hillside thick clumps of Castor-oil plant (*Ricinus communis*) were growing and in their foliage I collected some caterpillars, which in due course proved to be *Hylesia lilex*, Dogmin, and *Rothschildea jacobaeae*, Walk.

During the following year, this lovely hillside was levelled off in terraces for building sites, thus forcing the insect population to move further afield.

Papilio thoas brasiliensis, R. & J.

I have seen this splendid swallowtail in many parts of Brazil (indeed as far South as Buenos Aires, in a flower garden). Its striking colour design

and size ($4\frac{3}{4}$ inches wing span) make it very conspicuous when hovering about a flowering bush, or in full flight. It seems very partial to the flowers of lantana, and zinnia. Its flight is powerful, usually 6 to 12 feet above the ground, and its habitat ranges from the low levels near the beaches to altitude of about 4,500 feet, in the highlands.

During some years of short rainfall they are extremely scarce, but are normally fairly common.

The principal food plants of their caterpillars are various wild herbs said to be of the Piperaceae family, but they also thrive on several species of citrus, orange, in particular.

Papilio hectorides, Esp.

This swallowtail is found rather extensively in the more southerly regions of Brazil, favouring the highlands. I have never seen one below an altitude of 2,000 feet, and never in the North or North-East. It flies about 8 to 20 ft. above ground.

It likes clearings in forests and the bushy fringes of stream banks, and seems to be particularly fond of mimosa blossom. Amongst the flowers of these trees it desports itself with various Acraeids, Pierids and Ithomids as well as some odd bees and beetles.

The male, of about $3\frac{1}{4}$ inch wing span is much commoner than the slightly larger female which is also different in its colouring. The broad ivory-coloured longitudinal band of the male is, in the female, narrower and white; there are no ivory spots on the female's lower wings which have larger, but magenta coloured spots. In both sexes the base-colour of the wings is black.

Papilio torquatus, Cr.

In general appearance this swallow tail is rather similar to the male of *P. hectorides* but it is somewhat smaller (3 inches wing span); on the forewing there is a broad transverse ivory patch between the longitudinal ivory slash and the apex, and this is the most evident difference between these two butterflies.

In flight *P. torquatus* is rather slower but just as erratic and indecisive as *P. hectorides*, and usually at less than 10 ft. height. It likes to loiter along the edges of streams among the flowering weeds.

P. torquatus has the same range as *P. hectorides*, but these two species are seldom found together as *P. torquatus* likes the very damp places which are usually avoided by *hectorides*.

F. C. Hanson (5242)

ANNUAL EXHIBITION 1974

The Annual Exhibition of the Amateur Entomologists' Society will be held at :

Holland Park School,
Airlie Gardens,
Campden Hill,
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on Saturday, 28th September 1974

This is an advance notice to enable members to book the date and to plan their exhibit.

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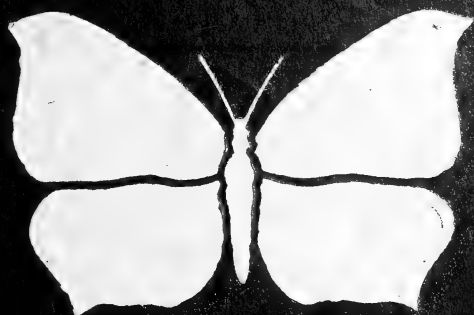
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536
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AUGUST 1974



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EDITORIAL

EX-EXHIB-EXHIBIT-EXHIBITION

Yes, it is *that* time of year again! Once more our annual exhibition is nearly upon us. Book the date; enter it NOW in your diary or engagement's calendar. SATURDAY SEPTEMBER 28th it is. The venue, as before, the Holland Park School, Airlie Gardens, Kensington. Not much time left, is there, to prepare your exhibit so why not start on it now, today, while the idea is there and the date noted.

What to exhibit? Why almost anything of an entomological or even pseudoentomological nature. Live, dead, photographed, serious, funny, technical, practical, from home or abroad, your fellow members want to see, and learn from, what you have been up to this past year, just as you want to see and discuss what they have been a doing of.

This year there will be a photographer in attendance and it is intended that a small selection of the more interesting exhibits will be illustrated in the Bulletin.

As usual prizes will be awarded to the most meritorious Junior members' exhibits.

The usual Traders will be in attendance with their wares, both new and second-hand. There will be livestock, deadstock, decorative ware, apparatus of all descriptions, books in endless variety. A limited amount of space will be available to members wishing to dispose of surplus entomological material.

Holland Park School is not as large as Olympia or Earls Court. Therefore, as our Annual Exhibition has become so popular, space must be used as economically as possible, and to do this book your space early. Why not let Bernard Skinner (address inside front cover) know NOW that you need the space for your exhibit?

ANNUAL REPORT OF THE COUNCIL FOR 1973

The Council is pleased to record another year of progress. Membership again increased and the Bulletin was expanded. The Council met on seven occasions during the year.

The Bulletin. Four issues of the Bulletin were published, three edited by Dr. P. Boswell and one by Mr. P. W. Cribb. The Bulletin increased in size from 144 pages in 1972 to 184 pages. The Council hopes to continue to maintain the increased size during 1974. Indices for 1969 and 1970 Bulletins were compiled by Mr. P. Taylor and Dr. Boswell respec-

tively during the year and work on those for 1971 and 1972 was completed by Dr. Boswell for publication in 1974.

Publications. The leaflet "An Amateur's Guide to the Study of the Genitalia of Lepidoptera" was published in 1973 and this became the Society's third most popular publication for the year, after the "Silkmoth Rearers Handbook" and "Killing, Setting and Storing Lepidoptera". Sales of other publications continued to be satisfactory and the Council records its thanks to Mr. L. Christie for his continuing assistance as our publications agent.

Meetings. The Annual General Meeting was held in March at the Rooms of the Linnean Society in London and was preceded by insect and natural history films made and shown by Mr. P. Bullard. The Annual Exhibition was again held at Holland Park School and attendance was again high. The low number of exhibitors was disappointing and the Council would welcome suggestions as to ways of encouraging more members to exhibit. A stall was mounted at the Annual Exhibition of the British Entomological and Natural History Society on a reciprocal basis.

Groups. The Conservation Group and the Exotic Entomology Group produced their own newsletters during the year and are the largest and most active groups. During the year the Conservation Committee became an official sub-committee of the Council.

Finance. During the year a Finance Sub-Committee was formed to advise the Council on financial aspects of the Society. The Hon. Treasurer will report more fully on these matters.

Charity Status. During the year the status of the Society vis-à-vis the Charity Act was considered with the aid of legal advisers, resulting in the proposal to amend the Constitution of the Society to be put to a special meeting of the Society.

The Council records its thanks to members of the Council who have retired during the year:- R. Claypole (Hon. Secretary), M. Hough, D. Corke and to Dr. P. Boswell who relinquished the office of Bulletin Editor.

J. Roche
Hon. Secretary for
the Council

REPORT FROM THE HONORARY TREASURER FOR 1973

It is a pleasure to propose the adoption of the Society's Accounts for 1973 and to report that financially we have enjoyed one of the most successful years in our history. In this Report I intend not only to review the Accounts but also to relate them to recent developments in the Society's management.

Turning to the Income and Expenditure Account the net surplus of £477 (after special provisions for legal fees and income tax) was the result of higher subscription rates and a marked increase in other income, compared with stability in our printing and administrative costs. Subscription income of £1,329, a new record, was higher than anticipated since the 20% increase in rates had less effect on membership than the experience of other societies suggested; over 80% of our 1972 members renewed. The strong influx of new members continued and we achieved a net gain of 24 members. Many of our other sources of income reached new levels and in particular donations of £141 included some very generous individual contributions, while bank interest at £131 was over £100 higher than in 1972. On the other side of the Account, expenditure overall was down on 1972, largely due to the change in printers which enabled the Society to publish larger Bulletins at less cost, as well as our ability to avoid the impact of V.A.T. almost completely due to the nature of our activities.

The Publications Trading Account also had a successful year. Gross sales came to nearly £700 for the third consecutive year. There was little change in our stock valuation and only one new title to finance. The net trading surplus of £287, with Building Society interest of £68, means that the Society is able to enter 1974 with a possible expenditure budget of over £1,000 to be spent on new and revised leaflets and handbooks.

In the last four years the value of the General Fund (shown in the Balance Sheet) has trebled and that of the Publications Fund risen by nearly as much. These Funds account for £5,125 of our gross assets of £6,046 and represent a substantial measure of protection in the event of a setback in our activities. We have reached this strong position through a marked increase in membership and by adopting what some of our members may feel to be a conservative attitude on expenditure. I believe that the Society's growing wealth should lead to the improvement and expansion of our activities, since it is not in our interests to promote entomology to make money at a time when we should aim to raise money to promote entomology.

Fortunately, the Council have taken two important steps during 1973 to clarify the Society's policy in this direction. Firstly, a Finance Committee of five Council members has been set up to advise and assist on specific matters which include the Society's tax position, plans for future expenditure and the appropriate investment of nearly £3,500 of our liquid assets which are in bank deposit and Building Society accounts. Secondly, and allied to this, the Council has decided to register the Society as a charity mainly to ensure that future investment income escapes tax and that the Society's property is properly managed between the Council and Trustees. During 1974 both these decisions will begin to take effect and the Society will benefit for the first time from regular tax-free investment income which can be managed as the needs of the

Society require. This income will supplement subscriptions and may enable members to enjoy greater benefits at no extra cost to themselves.

This new situation should, I think, enable the Council to manage the Society's resources more positively than in the past. Apart from uncertainties as to the treatment by the Inland Revenue of the surplus income the Society has enjoyed in earlier years, I think it is true to say that our finances have never been stronger and I hope members are reassured that this position is being consolidated to their ultimate advantage.

Nicholas Cooke
Hon. Treasurer

BALANCE SHEET AT 31st DECEMBER 1973

GENERAL FUND

EXPENDITURE		INCOME	
1972	1973	1972	1973
£	£	£	£
Printing Costs :		Subscriptions :	
719	788	903	1135
Bulletins		757 Senior (1972 : 723)	
Indices	54	159	194
242	14	242 Junior (1972 : 252)	
Membership Lists ...			
		1062	1329
861	856	125	141
		Donations	
56	16	70	81
Stationery		Advertising	
232	239	13	14
Postage and Distribution		Sales of Badges, Tie Pins	
34	29	62	60
Room hire, Meetings		Annual Exhibition (net)	
7	6	14	30
Depreciation (duplicator)		Wants & Exchanges (net)	
22	13	30	131
Conservation Group		Bank deposit interest	
21	20		
Insurance and Sundry			
1233	1179		
—	50		
Provisions : Legal Fees			
—	80		
Income Tax			
143	477		
Excess of income to			
General Fund ...			
1376	1786	1376	1786

PUBLICATIONS FUND

1972	1973	1972	1973
£	£	£	£
158	171	744	698
Printing new publications		Gross sales	
228	233	639	—
Selling expenses ...		Stock revaluation ...	
—	7		
Stock decrease ...			
386	411		
Trading surplus to			
997	287		
Publications Fund			
1383	698	1383	698

PUBLICATIONS TRADING ACCOUNT Year ended 31st December 1973

£	1767	Balance of Fund : 1st January	£	2830	£	1386	Investment : Halifax Building Society Deposit	£	1454
	997	Add : Trading surplus for year	£	287					
	66	„ Building Society interest	£	68					
2830					3185		Current Assets :		
						1289	Stocks (Publications, at cost)	1282	
22				...	233	48	Sundry Debtors	339	
						129	Cash at Bank : Current	343	
2852						1466			1964
		A. M. EMMET, President.			3418				3418
		N. H. COOKE, Hon. Treasurer.				2852		D. OLLEVANT, Hon Auditor.	
5007					6046	5007			6046

AN INTRODUCTION TO THE PIGMENTATION OF LEPIDOPTERA

The pigments of Lepidoptera are extremely variable, but for most purposes the true pigments (those not caused by interference or diffraction phenomena) may be divided into two main groups.

A.) Those pigments obtained either directly from the insects diet or derived from it.

B.) Those pigments manufactured by the insect.

Those which come under this second heading are in the main either melanin or uric acid pigments.

The uric acid pigments are produced from the insects excretory uric acid (formula $C_5H_4O_3N_6$). One very familiar example of a uric acid pigment is the colour of the Large White (*Pieris brassicae* L.). This is due to the presence of leucopteryn ($C_6H_5O_3N_5$).

The colouration of the male Brimstone (*Gonepteryx rhamni* L.) is caused by xanthopteryn ($C_6H_5O_2N_5$) differing by only one atom of oxygen from leucopteryn. These compounds and similar ones are soluble in warm ammonia (NH_3) solution, they may be retrieved by the addition of a mineral acid.

The melanin pigments are in general responsible for black, brown and some red colours. They are formed by oxidising a colourless amino-acid called tyrosin to tyrosinase. Melanin is by no means restricted to lepidoptera, in mammals it is responsible for piebald varieties as well as producing our 'freckles'.

The Vanessids possess a large proportion of the red pigmentation found in butterflies. These pigments are soluble (like uric acid ones) in ammonia and a strong mineral acid dulls them markedly. This dull compound is found naturally in some varieties, for example a variety of Small Tortoiseshell (*Aglais urticae* L.) called ab. *brunneoviolacea* Raynor has the normal red colour replaced by a buff one. The same sort of shade may be obtained by fuming a normal specimen for some time with gaseous ammonia (NH_3). When inspecting an old collection it may be noticed that the red colouration of the Vanessids has faded somewhat. This fading can be caused by excessively long exposure to light or by the pigment slowly reacting with the air, in which case it may be restored by fuming with chlorine (Cl_2) (chlorine may be made at home by adding an acid to household bleach, but be careful to only do this out-of-doors as chlorine is *poisonous*).

Of the pigments that are obtained from the larval food, it was once thought that the larval colour (normally green) was due to one of these. Recently it has been shown that in the vast majority of cases this is simply not so. The green pigment is either a totally different chemical or a form of rearranged chlorophyll. It is too early to state categorically whether or not pure chlorophyll is ever used as a larval pigment.

Green, although it is the normal larval pigment is a rare one in butterflies, in fact it is totally absent from our indigenous species. Even the marbling on the underside of the Orange Tip's (*Anthocharis cardamines* L.) hindwings is found on close examination to be a subtle arrangement of black and yellow scales (this marbling affords its owner excellent protection when resting on the flower heads of Hedge Mustard (*Sisymbrium officinale* L.), even from over zealous lepidopterists!).

In moths, however, green pigments are in comparison fairly widespread, for example in the Green Silver-lines (*Bena fagana* Fab.), the Oleander Hawk (*Daphnis nerii* L.) and the Large Emerald (*Hipparchus papilionaria* L.).

The pigment in the Large Emerald is different from that in the other two examples, and the two may only be satisfactorily separated by chemical means. (The pigment of the Large Emerald is turned brown by a mineral acid and the original colour cannot be regained by adding an alkali, whereas the brown colour formed by adding an alkali to the pigment of the Green Silver-lines can be partially recovered by the addition of a mineral acid). Of these two pigments the most common is that found in the Large Emerald.

The Flavones are a group of pigments that are obtained from the larval food-plants; they react with ammonia, producing a deep yellow colour. However these compounds are rather unstable and revert back to the original shade. If you wish to try this I suggest that you use either a specimen of Wood White (*Leptidea sinapis* L.) or better still a Marbled White (*Melanargia galathea* L.) as these two types give the most dramatic results.

If you experiment, I think that you will soon find that this branch of our hobby can be as absorbing as many of the other aspects of entomology.

Clive Sheppard (4431)

BUTTERFLIES ON THE ISLES OF SCILLY, JUNE 1973

When the holiday venue has at last been decided upon and booked, I am sure that for many of us interested in Entomology, rather than considering the well earned rest that lies ahead, visions and thoughts of the new and interesting insects to be encountered preoccupy our minds. I was no exception to this when booking our holiday in the Scilly Isles. The association of warm islands and plentiful flowers conjured up a scene of some considerable interest to a dad and his two sons all keen on butterflies. The illusion was soon exposed and the eager anticipation shattered when readily available literature on butterflies of the Scillies was consulted. E. B. Ford (1945) in his "Butterflies" seemed to invariably write "absent from Scilly Isles" when dealing with

the distribution of butterflies. A request for available information to the AES Publications Agent, was rewarded with a paper entitled "Some Preliminary Observations on the Lepidoptera of the Isles of Scilly with Particular Reference to Tresco" by Messrs. Austin Richardson and Robin M. Mere. Ent. Gaz, 9: (1958). This excellent paper further confirmed my suspicion that the week in June was not to be looked upon as a chance to add to our very small collection of British butterflies. Apparently, only sixteen different species had been recorded; only eleven being common. It became readily apparent to me that not only was there a lack of butterflies to be found in the Scillies but more importantly perhaps there was a lack of information available. Certainly at any rate, up to date information. This then determined the purpose of the impending holiday. The pen was going to be far busier than the net on this occasion. The plan was to compile a day by day account of the butterflies seen with approximate number of each species, the locality where sighted, and the weather conditions at the time.

Setting off by car in the small hours of June 23 we arrived in Penzance some three and a half hours early for the helicopter flight which enabled us to retrace our steps to an inland spot last visited in 1955. Then, a very young collector, I remember the joys of watching the Silver Washed Fritillary (*Argynnis paphia* L.) basking in the sunlight among the brambles (*Rubus fruticosus*), and often longed to repeat the experience. Being early in the summer it was just too much to expect that I could show my own two boys those beautiful insects. Although well off the beaten track the site was quite easily found and the trouble taken worth while, for a varied selection of butterflies was seen (see table) including the lovely High Brown Fritillary (*Argynnis adippe* L.) in reasonable numbers. At one stage no less than five were seen in the space of two minutes. The boys' beginners nets and my own kite net were safely packed away with the luggage and the spring steel folding pocket net, purchased especially for the holiday and such an occasion, proved to be inadequate for the job. High Brown Fritillaries travel at a fair rate of knots when put to it! The bag supplied was as flexible as a bag of cement. This, incidentally, was later changed for one of the bags on the boys beginners net and this solved the problem. In future I shall remember to always try a tool before putting it to serious business.

Picnic lunch and reminiscences over, it was back to the Heliport and a new experience in flying for all of us. In this day and age when airports and the inevitable delays are frequently complained of, it is worth recording that the little BEA Heliport at Penzance, must be second to none for efficiency. Only ten minutes lapsed from landing, unloading thirty plus passengers and all their luggage, reloading fresh cargo of thirty plus passengers and all their luggage, through to take-off. This speed and efficiency was reached without any sacrifice of helpfulness or friendliness

and, it might be added, without turning off the rotor blades! The journey itself from Penzance to the Heliport on St. Mary's in the Scillies takes only twenty minutes and was quite aptly described by my father as resembling a short ride in a lorry.

The approach to the Scillies by helicopter is exciting and it seemed as though we were about to land on some small cluster of tropical islands nestling in a beautiful calm blue tropical sea. We disembarked with our cargo as speedily and efficiently as we had stepped aboard twenty minutes earlier. The small airport bus was waiting and within a few minutes had delivered us to our guest house door in Hugh Town, the capital of St. Marys. The pleasant journey was made in brilliant sunshine through narrow dry stone walled country lanes which reminded me of the Cornish mainland.

While my wife dutifully unpacked the luggage I took the opportunity of taking our little dog and the two boys out for a walk before the evening meal, due to be served at 18.30 hours. The short walk along the coast to Porthmellon beach, which is to the North and East of Hugh Town, at least showed that the Speckled Wood butterfly (*Pararge aegeria* L.) and the Small White butterfly (*Pieris rapae* L.) were very abundant on St. Marys. A solitary large Meadow Brown butterfly (*Maniola jurtina* L.) was also seen. I must confess that the combination of the warmth from the sun, the lovely soft white sand on the beach and the two boys playing far enough away from my resting place, was too much and I succumbed to the luxury of a sun drenched slumber for about one glorious hour. Who knows what lepidopterists delight passed my closed eyes during that hour! As I had only had three hours sleep in the past thirty I did not really care. The inbuilt alarm clock, more commonly called my stomach, obligingly awakened me in time to take my charges back to the guest house for a most appetising meal.

The Isles of Scilly comprise of nearly two hundred islands. Most of these are stacks, reefs and islets. They are situated some twenty eight miles South West of Lands End. Only five are now inhabited with a total population of approximately two thousand. St. Marys is the largest island with a population of about 1,650 and, as already mentioned, Hugh Town is the capital town of the islands. The other inhabited islands are Treco, St. Martins, Bryher and St. Agnes. The Scillies enjoy a mild climate with only a few night frosts in winter. The rainfall is much less than that of the mainland but strong winds are predominant in the winter. The islands are granite covered with a mainly sandy or peaty soil. There are very few trees, these being confined mainly to St. Marys and more so to Treco. Treco also boasts the world famous gardens of Treco Abbey. These are open to the public and we visited them. The visit being covered in the notes following. Exotic and sub-tropical plants flourish in the open air in these most beautiful gardens amid a splendid setting.

In an attempt to retain the individuality of the islands, an admirable scheme has recently been introduced to severely limit the quantity of new buildings and extension works. This, in turn, limits the number of holidaymakers that the islands can accommodate at any one time to approximately 2,000. This should, of course, be beneficial to the existence of the insect fauna of the islands.

Life for the inhabitants and holidaymakers alike is unsophisticated and the general holiday pattern revolves around the harbour of Hugh Town. Small boats leave the harbour each morning laden with holidaymakers and these make their separate ways to the other islands. Once there the only means of transport is ones own legs, but most of the other islands can be walked around in a day quite easily. The boats return again in the evening to pick up the holidaymakers and take them back to Hugh Town. In this way the entire holidaying population is spread throughout the Scilly Isles each day. This, in turn, results in a very quiet and private time for all concerned and presents virtually no difficulty in finding a deserted beach. Surely a luxury in this modern time! Our holiday roughly followed this pattern and the table shows our schedule for the week giving the date, place visited, weather conditions and butterflies positively identified, with exact number when considered important.

It must be borne in mind when studying the following table that it does represent only one week's observations of the distribution of butterflies on four islands and, consequently, must needs be somewhat scanty and inconclusive. However, I am sure that some record is better than none at all.

Date	Place	Weather	Butterflies Positively Identified	Numbers
23	Newmills,	Sunny,	<i>Pieris brassicae</i> L. (Large White Butterfly)	2
	Nr. Penzance,	hot,	<i>Pieris rapae</i> L. (Small White Butterfly)	Common
	Cornwall	no wind	<i>Pieris napi</i> L. (Green Veined White Butterfly)	6
			<i>Aglais urticae</i> L. (Small Tortoise-shell Butterfly)	Common
			<i>Argynnis adippe</i> L. (High Brown Fritillary)	7
			<i>Pararge aegeria</i> L. (Speckled Wood Butterfly)	Common
			<i>Maniola jurtina</i> L. (Meadow Brown Butterfly)	Common
			<i>Lycaena phlaeas</i> L. (Small Copper Butterfly)	Common
			<i>Polyommatus icarus</i> Rott. (Common Blue Butterfly)	Common
			<i>Erynnis tages</i> L. (Dingy Skipper Butterfly)	1

			<i>Ochlodes venata</i> Brem. & Grey (Large Skipper Butterfly)	Common
			<i>Thymelicus sylvestris</i> Poda. (Small Skipper Butterfly)	Common
	Hugh Town, St. Marys,	Sunny, hot,	<i>P. rapae</i> <i>P. aegeria</i>	Common Very Common
	Scilly.	no wind		
			<i>M. jurtina</i>	1
24	Penninis Head, St. Marys.	Sunny, hot, high cloud in p.m.	<i>P. brassicae</i> <i>P. rapae</i> <i>P. napi</i> <i>A. urticae</i> <i>P. aegeria</i>	3 abundant 6 7 Very abundant Common Common
			<i>M. jurtina</i> <i>P. icarus</i>	
25	Boat trip round Bishop Rock Lighthouse in a.m. St. Agnes p.m.	dull, light drizzle	A Humble Bee (<i>Bombus terrestris</i> L.) inspected our launch off one of the uninhabited Western Rocks.	
		high cloud, weak sun, v. light rain.	<i>P. rapae</i> <i>A. urticae</i> <i>Vanessa atalanta</i> L. (Red Admiral Butterfly) <i>P. aegeria</i> <i>P. icarus</i>	abundant 9 2 7 Common
26	Penninis Head, St. Marys.	cloudy with warm sunny spells. S.W. Wind	<i>P. brassicae</i> <i>P. rapae</i> <i>A. urticae</i> <i>V. atalanta</i> <i>P. aegeria</i> } only at sea <i>M. jurtina</i> { level <i>P. icarus</i>	2 Common 3 2 Common 2 Common
27	Nature Trail, Holy Vale to Porth Hellick. St. Marys	light rain all day. S.W. Wind.	No butterflies sighted all day.	
28	Tresco Gardens, Tresco.	sunny, v. hot, S.W. Wind	<i>P. rapae</i> <i>A. urticae</i> <i>V. atalanta</i>	6 Common Very Common
			<i>P. aegeria</i> <i>M. jurtina</i> <i>P. rapae</i>	3 2 Very abundant Common
29	St. Martins	sunny, warm, S.E. Wind	<i>A. urticae</i> <i>V. atalanta</i> <i>M. jurtina</i> <i>P. icarus</i>	4 Common Common 6

As will be seen from the table only eight different species of butterfly was recorded. It is interesting to note that all of these with the exception of *V. atalanta* were also recorded at Newmills, Nr. Penzance, on the mainland. From experience in the past, this species is found there and it would appear that the Scillies have nothing new or uncommon to offer as far as lepidoptera is concerned. However the distribution of butterflies on the islands brings to light some interesting points. *P. aegeria* is common everywhere at sea level but surprisingly enough was not in evidence at all on St. Martins. *M. jurtina* was fairly common on St. Marys and St. Martins, two only sighted on Tresco but absent entirely from St. Agnes. *P. icarus* was common everywhere else but absent from Tresco. All of the eight species recorded were sighted on St. Marys, the other three islands visited each sporting five species.

These observations differ from those reported in the paper by Richardson and Mere previously referred to, in that *M. jurtina* was only common on St. Marys and St. Martins and absent from St. Agnes and not abundant everywhere as stated in the paper. Furthermore *P. brassicae* is also reported as common on Tresco and St. Marys, but we only observed a small number on St. Marys and none at all on Tresco. Perhaps the most remarkable difference being that *P. aegeria* was not recorded at all whereas we found it very abundant on St. Marys and in small numbers on both Tresco and St. Agnes.

One *V. atalanta* observed in Tresco Gardens was extremely worn and seemed most reluctant to take to the wing even when handled. It is possible that this one could have overwintered on Tresco? It certainly did not appear to be capable of, let alone willing to, fly any appreciable distance.

When comparing *P. aegeria* taken on St. Marys with those taken on the Lizard, Cornwall the previous year, it was noticeable how much darker were the markings of the Scilly specimen. I have recently been informed there is a form peculiar to the Scillies and unfortunately I was ignorant of the fact at the time, otherwise particular attention could have been paid to this.

Nearly all the butterflies taken in the net were found to be in a damaged condition and this was attributed to the prevailing winds that are almost always in evidence on the islands.

In conclusion, I feel that much further and far more detailed study of the lepidoptera of the Scillies is long overdue. Such a study might throw some light on the question of certain butterflies frequenting certain areas and seemingly ignoring similar habitats close at hand (sorry wing). The similarity of all the islands and the small number of species found on the Scillies would assist such a study and possibly bear fruit in a comparatively short space of time.

M. S. L. Simpson (4859)

A DECADE WITH BUTTERFLIES

The summer of 1974 marks a small milestone for me. It will be the tenth one that I've spent amongst butterflies. I thought it would be interesting to reminisce on some of my experiences over the past, the changes that I've seen take place and my thoughts for the future which I feel must concern every person who has an interest in Lepidoptera.

My interest developed whilst I was at school and I fortunately lived in a house which backed onto a wonderful rough field which contained many interesting species of Lepidoptera, so it was home from school onto the field. I made a small collection of the common butterflies mainly consisting of a pair of each kind, but I was soon to lose interest in this side of the hobby. This came about when in 1966 the field in which I spent lots of time watching all the butterflies was suddenly uprooted, by a large yellow bulldozer, and a useless car park developed in its place. This was a severe setback to my interest and this action prompted me to discontinue any further collecting and killing of the delightful creatures, but to try and help in some way to preserve their kind, because I realised that I was getting great enjoyment out of merely watching and being amongst these beautiful creatures.

I was encouraged by a fellow enthusiast to take up photographing the insects as a desirable and painless means of amassing a large collection. This is the best development one can make in the interest and it is indeed gratifying to know that after your camera has 'killed' your specimen she can then fly off and go about the business of laying her full quota of eggs. How many a female butterfly has met her death at the bottom of a killing jar with future generations still inside her? My present day colour transparency collection of British Butterflies numbers four-hundred and sixty-nine and includes fifty-one species, many of which are depicted in full life-history from courtship flights to eventual pairing, shots of various females of species depositing eggs, the eggs, larvae, larvae about to pupate and pupae. This work surely outstrips any collection of dead insects in scientific value, let alone just interest value. It is not an over-expensive addition to one's pastime, but it is far harder work than using a net and one needs a far greater knowledge of a particular species in order to photograph it, than say the run-of-the-mill collector does.

How things have changed in ten years as far as entomological dealers and their goods are concerned. I sometimes wonder how nowadays people can afford to purchase livestock, books, apparatus and all the odds and ends which make up a Lepidopterist's equipment. People with an interest in butterflies must also be financially well off. How else can they afford to purchase papered or set insects, exotic livestock at the exorbitant prices they are. Even the lepidopterist's essential text-books have soared in price. Gone are the days of £2.50 or £3 books in value. One

now pays up to £10! Yet the dealers keep going and indeed others come into being. How they survive beats me. Certainly the young person at school must have suffered and they cater solely for the older people who've got more money than sense. How many times have we heard of how expensive the photographer's camera and equipment is! Far more value for money than a lifeless specimen of *Papilio ulysses* from the Solomon Islands, minus antennae!

Another thing that fascinates me and indeed disturbs me, is the fact of the lack of news media throughout entomological circles. There have recently been two items of great interest to lepidopterists. Indeed they should be of paramount concern, and yet we hear nothing. The Entomological journals do not publish the items, no they stick to long account's of J. Smith's adventures with butterflies in Northern Greece. All very interesting and indeed important records, but mainly just making most people envious as on their last trip out it was overcast and cool and they all kicked up several *M. jurtina* and one or two *C. pamphilus*! The news that I'm making such a fuss about is firstly the recent disappearance of Chequered Skipper (*C. palaemon*) in its British localities and the publication (South's Book, 1973) of a species of butterfly as a new resident of Britain. This being Northern Brown Argus *Aricia artaxerxes*. The evidence that *artaxerxes* is not just a sub-species of ordinary *agestis* seems to be conclusive and indeed was heavily suggested in Richard South's book, first published in 1906, on British Butterflies. In this old edition on Plate 104 there is indeed a photograph showing two eggs of *agestis* and the other of *artaxerxes* and one can clearly determine dissimilarities between the two. Yet it was not until 1965-68 that the species were separated and yet it didn't make the headline news it was worthy of. If its good news like the above or bad news like that of *C. palaemon* those interested must be informed.

A note here about *C. palaemon*; a species which as yet I have not photographed for my collection apart from specimens which I did manage to succeed with in Austria in Spring 1973. There has evidently been no reports of this insect during 1972-73 and indeed the position sounds grim. One must be optimistic about the situation and hope that in 1974 the species is observed once again. Perhaps the poor summer of 1972 had an effect on it; whatever the cause anyone selfish enough to try to collect is over the next five years is certainly doing a great disservice to his fellow entomologists. It would be wrong to think that there are such people who would boast that "I collected the last British *C. palaemon*" but after hearing reports that even, to this day, people with nets are turned away from the Large Blue locality I would not really be surprised. One must always have in mind the fate of the British Large Copper (*L. dispar dispar*) in the Whittlesea Mere district. In the 1820's the insect was apparently abundant in the area yet thirty years later it was extinct. Two reasons, among others, were attributed to this event,

that of the discovery of the whereabouts of its larva and the selling of it to dealers which followed. And take note, the heavy predation on the species by collectors in the 1840's. I believe that many of our local species of today should be left completely alone by collectors if they are not to suffer the same future as the ill-fated Large Copper. These are Lulworth Skipper (*T. actaeon*), Silver-spotted Skipper (*H. comma*), Swallow-Tail (*P. machaon*), Wood White (*L. sinapis*), Brown Hairstreak (*T. betulae*), Black Hairstreak (*S. pruni*), Adonis Blue (*L. bellargus*), Duke of Burgandy (*H. lucina*), Purple Emperor (*A. iris*), Large Tortoiseshell (*N. polychloros*), Marsh Fritillary (*E. aurinia*), Glanville Fritillary (*M. cinxia*), Heath Fritillary (*M. athalia*). I like to add here that this list has been derived from personal experience with all of these species excluding Large Tortoiseshell (*N. polychloros*) and having witnessed the effect of collecting on several of the species. When tackled a collector always states that the few specimens he has taken will have no effect but what he never seems to realise is that he is in a popular well known area where these species are very local and that several collectors may visit the same locality, in the same year take the same number of specimens and tell the same story. This may happen year after year and when a species vanishes from a locality, which is an increasingly common occurrence nowadays, the collector seems to vindicate himself by explaining that his few specimens had little effect on its disappearance and it was probably Forestry Commission or Chemical sprays or perhaps even a fire?

Over the past few years I've had many pleasing experiences with butterflies and they've left me with many memories to warm my thoughts in the cold and dreary winter months. I remember for the first time witnessing Silver-washed Fritillary (*A. paphia*) females depositing eggs in the crevices of young oak bark and thinking that she was doing just as the books mention when all of a sudden she took off and flew straight at me, alighting on my trousers. I stood very still, hardly breathing, as she carefully crawled upwards and deposited an egg in a crease in my red tee shirt! Can they discriminate between a man that carries a camera and one that wields a net? What a wonderful sight it is to see a female Purple Emperor (*A. iris*) glide out from the uppermost branches of an oak and 'strike' a sallow bush, deposit one or two eggs and away into the skies again. On this occasion in a Surrey locality I found that egg so quickly that the cement which the female uses to stick it to the leaf, was still oozing down the sides of it. I must have been within two or three feet of this magnificent, mysterious Queen of the forest. How wonderful it was to see Britain's largest species, the Swallow-Tail (*P. machaon*) going about its business of depositing its eggs. A large female gracefully alighting at the top of a Marsh Hogs Fennel (*P. palustre*) plant, and with wings still fluttering, bending her abdomen, so delicately round, and finally depositing its precious cargo. Again, how enjoyable it is during late

May to visit Sussex localities of the Wood White (*L. sinapis*). Their non-stop unusual and unmistakable flight is fascinating and I have been fortunate enough to observe this species' habits in detail. I've seen it pair, lay eggs and what is surely the most unique courtship ritual amongst British Butterflies. A male and female will land opposite one another, facing each other, very close together, and the male will touch the female with alternate antennae, the female responding by suddenly flashing her wings open. I've observed this three times and on each occasion with a time span of over five minutes. What can beat the magnificence of Small Tortoiseshells (*A. urticae*), Red Admiral (*V. atalanta*) and Painted Lady (*V. cardui*) on the Buddleia's of late summer and the Michaelmas Daisies of autumn as the leaves fall! The Clouded Yellows (*C. croceus*) flying fast and low over the downs adding the glorious colour of their golden wings to the countryside. I paid a glorious evening visit, last year, to a strong Chalkhill-blue (*L. coridon*) locality and was literally overawed by their abundance as they began to roost amongst the taller grasses with thousands of males and females alike basking wings outspread as the sun began sinking fast in the western sky. An inspiring, gratifying and memorable experience.

Last summer I made my first venture abroad with my camera, and visited Austria in the Northern Tyrol and had many enjoyable experiences with Butterflies, some unknown in this country, and others like *C. palaemon* and *C. australis* very rare. It was most interesting and worthwhile, but it was still good to get back to the English scene and all our species which although small by number are equally interesting and worthwhile as their foreign counterparts. It is sadly true that the whole of my future enjoyment to be had amongst British Butterflies, just watching and photographing them, is in the hands of others. How many more species will evolve into a struggle for the very existence on our shores over the next decade? What of the future for Large Blue, Chequered Skipper and several others, in desperate straits now? The prospects are grim and the future bleak unless a drastic turnabout is made. The policy of the collector must change; many species must be left totally alone, from now, 1974. It is again sad that the people who work our forests today are so feeble. Talking to one such person, who was a forester working on Crown Estate Woodland and mentioning my interest in butterflies to him, he said "Yeah, but they're a bit of a nuisance, keep fluttering in your face sometimes!"

K. J. Willmott (3822)

A BOXING DAY FIND

On December 26 I decided to put in a determined search for the elusive *Callosamia promethea*. The *promethea* is very local in S. E. Michigan. I have come upon scattered cocoons, and have, on occasion,

attracted wild males to caged females, but I had never located a viable colony.

In the spring of 1973 I purchased some *C. promethea* cocoons from N. Carolina, and, together with my associate Ronald J. Priest, released four fertile males in a locality where we had found traces of an old colony. We revisited the area in the winter, but there was no trace of any viable cocoons. We assumed the failure to establish a colony was due to the pupae belonging to a double brooded southern race, unable to stand the Michigan climate. The answer seems to be to use native Michigan *promethea* to try to spread the species here.

On December 26 therefore, I drove out to a location where I had found one alive pupa a month before. However due to a recent large snowfall, I had to park about two miles along the road. The area looked promising, and I set out, examining small Wild Cherry trees along the way. I found a few old dead pupae, but nothing of any importance, until I reached a small plateau area, almost bare of trees. It was here I noticed a small Wild Cherry that, from some distance away seemed to be bearing fruit! On close examination I discovered the tree had seventeen *C. promethea* cocoons on it. Two adjacent trees had a similar number. None of these trees were much over four feet high, and must have been almost defoliated during the summer by the larvae. I retained ten viable cocoons for use in trying to establish the species elsewhere, and I intend to release at least two fertile females back in the same location, to make up for the ones I took. On the way back to the car, I literally stumbled across a large *Antheraea polyphemus* cocoon, spun up in the grass!

Ronald Priest and myself revisited the area about a week later, and collected all the cocoons which did not contain a living pupae (determined by weight and feel). On close examination we found; two destroyed by rodents, seven diseased, two killed by birds, and seven hatched. Interestingly enough none had been parasitised, even though the colony was at least two years old. I will observe the colony as long as I can to record relevant population dynamics.

Chris A. Young (5236)

BREEDING SYNTOMIS PHEGEA L.

On August 4th 1972, I obtained a dozen newly-hatched *S. phegea* L. larvae. The moth is a rather local European Burnet-like moth which belongs to the family *Syntomidae*. The stock I obtained had originally come from Italy.

The first instar larvae were light brown in colour, with the last segment grey, head deep chocolate, and were fairly hairy. I fed them on clover and dandelion; they also eat other low-growing plants.

As they changed their skins, they became darker and furrier, and the head lighter in colour. They grew quite slowly, because in nature they

hibernate and feed up again in the spring. Dandelion and clover were little trouble to find in the winter and the larvae ate very little.

By April 3rd 1973, the larvae were over one inch long, and two had made flimsy cocoons around themselves. These were made from the hairs. Ten larvae had pupated by May 12th, when I noticed that the first two pupae had changed colour. They were previously light red, now they were black with a red stripe, which got brighter when nearing emergence.

Soon the pupae hatched into Burnet-like moths with long thin fore-wings and very small hind-wings. The wings and body were slightly iridescent blue/black. Around the abdomen was a bold yellow stripe (which was red on the pupae.), and another yellow stripe lay along the thorax. The moths were then transferred to an airy cage. The males were recognisable from the females by their longer and thinner bodies. The moths paired in the morning, mainly in sunshine, for a short time only. The moths rarely attempted to fly. Soon, masses of small yellow ova were deposited on the netting and the cardboard. On May 31st, the ova turned dark brown and the larvae could be seen inside. They hatched that day, and so the life-cycle began again. This time the larvae grew quickly and I had moths again by late August 1973.

It was very enjoyable rearing this species, and it is easy, thus suitable for the beginner.

P. D. Brock (4792J)

MORE ABOUT THE DWARFS

Since my report on the dwarf Orange Tip Butterfly (*Anthocharis cardamines* Linn.) there have been some very interesting reports and views from other members and editors in the bulletin.

I have seen more Orange Tips of smaller than average dimensions since but none was as small as the first. I have yet to find a female dwarf of this species as did S. H. G. Humphrey (2988). Perhaps I am unobservant.

The mention of the dwarf Small White (*Pieris rapae*, Linn.) by A. J. May (4347) was of interest to me as I recently found, in an old collection, an undersized specimen of Peacock Butterfly (*Inachis io* Linn). It had a wingspan of 48 mm, the normal span is about 60 mm. It seems that this miniaturisation is not confined to Orange Tips.

The editors' notes were interesting also. A few months ago I was breeding several generations of Greater Wax Moth (*Galleria mellonella* Linn.), a well known (to beekeepers anyway!) pest in the bee hive. While rearing the second brood I ran out of old wax so the larvae were forced to devour any scraps of wax in the bottom of the rearing cage. The larvae also ate any dead wax moths which were provided as they were too damaged to set. The result of all this was that the life cycle was

completed in less than a month. When the adults emerged there was a large proportion of males and all the moths were undersized. The size of the dwarf males was a 21-24 mm wingspan while the normal span of a male of this species is 30-34 mm. The moths were not affected in any other way and another brood has been produced since, of normal size, as the larvae of this brood were well fed. It seems, therefore, that this was a case of dwarfs produced by undernourishment.

K. A. Moseley (4733J)

[Dwarf *Pievis brassicae* L. (ab. *minor* Ksienchopolsky) are produced by starvation of final instar larvae and this is probably the cause of most dwarf insects.—Ed.]

APHANTOPUS HYPERANTHUS LINN. AND MANIOLA

JURTINA LINN. IN COPULATION

In August 1973, a fellow entomologist and I spent an enjoyable week in the peace and tranquility of the New Forest.

On the 8th August we were strolling along a woodland ride in one of the enclosures and admiring the graceful flight of the Silver Washed Fritillaries (*Argynnis paphia* Linn.) and observing the remarkable camouflage of the resting Grayling (*Hipparchia semele* Linn). We stopped to have a sandwich at the opening of a gravel pathway where a Fritillary meandered deeply into the woods before disappearing amongst the bracken. However, despite these glamorous attractions we paid attention to the Meadow Browns (*Maniola jurtina* Linn.) and the Ringlets (*Aphantopus hyperanthus* Linn.) whose wings were rather faded and membranous in appearance. Then, supposedly, we noticed two Meadow Browns in copulation, but on closer examination we found that one was a Ringlet. There was no doubt about it; a male Ringlet was mating with a female Meadow Brown.

We were certainly amazed at the time and carefully put the two butterflies in a container with some grass. After about fifteen minutes they parted.

The next day they both looked very weak although they had not been exposed to direct sunlight or maltreated in the hotel room. That evening the Meadow Brown died without producing any eggs, but we were pleased to have witnessed such an event so we did not mourn very much. We regretted the fact that neither of us had a camera to record the event. We have never heard of similar incidents or found anything in literature on the subject. We still are left with the thought of whether fertile eggs could have been produced from this union and if so what would have resulted?

Can anybody help us with our enquiries?

P. A. Arak (4909)

NOTES ON THE REARING OF THE GREEN HAIRSTREAK AND HOLLY BLUE BUTTERFLIES

Both the Green Hairstreak (*Callophrys rubi* L.) and the Holly Blue (*Celastrina argiolus* L.) are rather difficult insects to obtain in perfect condition in the field, both also have elusive habits, *C. argiolus* often keeping out of range of the net, and *C. rubi* disappearing amongst hawthorn with regular monotony. However both are fairly easily reared on Dogwood (*Cornus sanguinea* L.) flower buds in May and June, the larvae keeping to the cluster of buds so long as there is sufficient nourishment for them. *C. rubi* larvae should be kept away from each other as they are well known cannibals, I have had little trouble with *C. argiolus* in this way, and have had as many as six on a clump of buds. The only real problem is the foodplant itself; Dogwood buds do not last very long in water and must be replaced every two or three days, particularly when the larvae become larger.

As the spring generation of the Holly Blue appear early in the year, usually April, larvae of this species will feed mostly on the flower buds, clearing out the soft interior, leaving only when moulting when they usually fix themselves to a leaf; for this reason I always leave a few leaves on the stems. Green Hairstreak larvae feed a few weeks later as females do not lay until well into May, and these larvae will consequently complete their growth on the flowers which will need replacing every other day. These flowers have a rather sickly odour, and in the field attract many species of flies.

When full fed the larvae of both these species walk downwards to the bottom of the cage to search for a pupation site. I favour moss on the floor of the cage, the larvae crawl underneath this and fix themselves by a very slender girdle to the base of the cage. *C. argiolus* larvae turn from green to a pinky brown colour at this stage. *C. rubi* larvae change little in colour, but the yellow arrow shaped markings on the sides grow fainter.

Both females deposit on Dogwood flower buds, although *C. rubi* seems reluctant from my own experience to deposit many eggs, the best bet here is to capture a few females, and be content with a few eggs from each, after a couple of days re-releasing them back into the original locality. The eggs of both butterflies are pushed well into the clump of buds, and are not always easily found, usually they are attached to the sides of the buds, sometimes to a foot-stalk; they are flat and pale greenish-grey in both species, slightly greener and shiny in *C. rubi*.

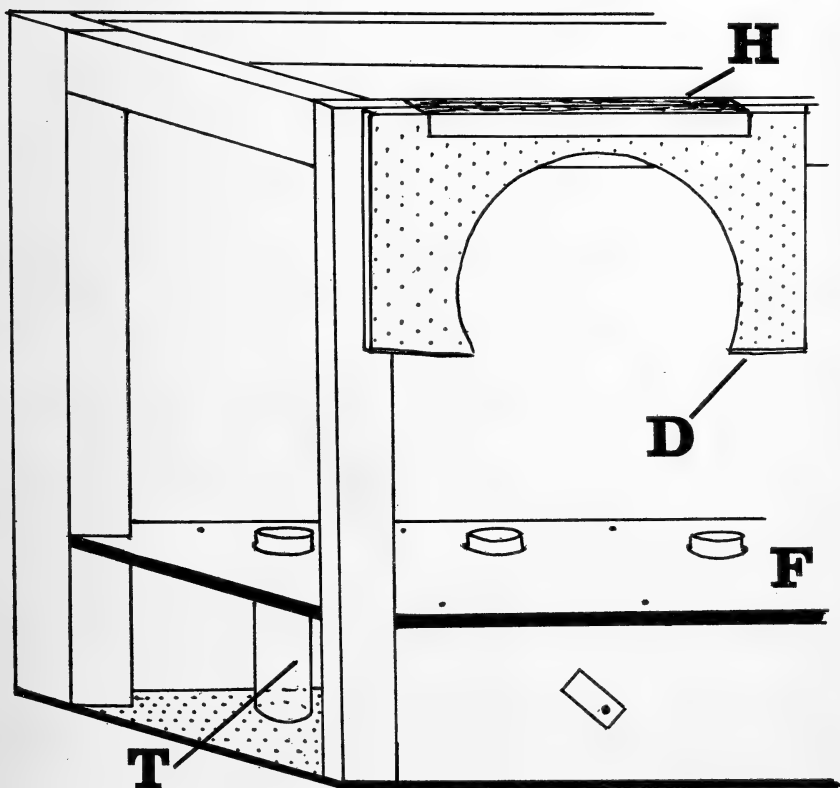
In conclusion I must add of course it is only the spring brood of *C. argiolus* that feeds on *C. sanguinea*, and both species have other food-plants particularly *C. rubi*. This account concerns my own experiences with the one foodplant only.

J. Platts (4300)

A CAGE FOR EGG-LAYING BUTTERFLIES

In a previous article (Bull. amat. Ent. soc. 32: 166-167), I stated that the caterpillar cage described was not really suitable for egg-laying purposes on account of the opening being at the top. I have since designed, and used, a cage built on the same system, but which has the means of access at the side.

A part of one of these cages is shown in the accompanying illustration. The double floor is made of hardboard (or plywood), holes being made in the upper floor (F) by means of, for example, a power drill fitted with a normal drill or a circular saw of appropriate diameter (they can be purchased in sets, the cheaper ones being quite adequate for our purposes). A glass or polythene tube sits in this sort of hole and for laying adults the fit need not be very tight. I use flat-bottomed glass tubes of $\frac{7}{8}$ in diameter, but one could even utilize test tubes. Note that enough tube is left projecting through the hole to enable the tube to be extracted with the fingers.



As mentioned in the previous article, I obtain oddments of wood and I therefore adapt what I get to the construction in question. For Lycaenids, Satyrids and the smaller fritillaries, etc., I find a cage of height (from the upper floor) 15 to 20 cm perfectly adequate. A 10-15 cm width is suitable, and note that the holes for the tubes (T) lie closer to the far side of the cage (the 'sunny side'), where the foodplant stems or twigs are allowed to touch the netting. As regards length, I prefer around 50 cm for the butterfly types mentioned, and I furnish this length with nine holes, such that each tube is separated from its neighbour by 5 cm. This enables a mass of foodplant to be laid out in a straight line down the 'sunny side', giving the female butterfly a better deal than she often gets from Nature. Hitherto I have dotted real flowers among the foodplant, but I shall now use the artificial flower set-up recommended by Mr. Gardiner in the same issue of the Bulletin referred to above.

You will note that I have referred to the far side of the cage as the 'sunny side'. This is because most butterflies seem to spend a lot of time just walking up the side of the cage nearest that heavenly body, and when confronted by their foodplant often absentmindedly flip an egg on to it as they wander past. The illustration shows the cut-away door (D), made of hardboard, 'inside-out'. Anyone who has tried to discover small hairstreak eggs on an uneven surface will realise why: the smooth side provides a much less confusing background.

The door is in fact in three separate units. Insects gadding about in so small a cage will quickly make their escape if you have a single long door and have to open it in the midst of their frolicking. I cut two holes in each door section, allowing the holes to overlap in a roughly hour-glass fashion, and can then spy on the inmates of the cage as the fancy takes me. The finished product reminds my wife of a bevey of old-fashioned lavatories with ornate doors, but she admits that it is practical. Hinges (H) are easily made from strips of stiff cloth glued in place. A simple wooden catch holds each door in the closed position.

The cheapest materials with which to cover the cage are butter muslin and ordinary curtain netting, though mosquito netting adds a professional touch. Be prepared to cut holes (large ones!) in the netting from time to time, patching these with odd bits simply glued quickly into place over the gap. Many female butterflies will lay near the foodplant rather than on it.

I give several females the run of a whole cage, but I do have one cage which is divided by partitions into three parts. It is in any case better to build one unit rather than three completely separate cages, as you save on material.

The inside of such a cage should be sprayed with lukewarm water two or three times a day. If you leave the wood unpainted, some of the moisture will soak into the surface and will prolong the effect without causing undue warping.

Leigh Plester (2968)

WASP AND HORNET DISTRIBUTION MAP SCHEME

A scheme to map the distribution of wasps and hornets was started in 1973 under the guidance of the Biological Records Centre at Monks Wood Experimental Station. Maps will eventually be prepared showing the occurrence of each species in the 10 km squares of the National Grid from which a positive record has been received. Records are required from all parts of Britain, the Channel Islands and the whole of Ireland. If you would like to help in this scheme please send your specimens in matchboxes to MR. M. E. ARCHER, DEPARTMENT OF BIOLOGY, ST. JOHN'S COLLEGE, HEWORTH CROFT, YORK, YO3 7SZ indicating the date and place of capture of each specimen.

Although it is not necessary it would be helpful if you could also give the 10 km grid reference from the National Grid for Britain and from the Irish Grid for Ireland. It is better not to attempt to give grid references for the Scilly and Channel Islands.

Wasps and hornets can be collected by using a plastic bag or tube or just by swatting and they can be killed by pressing the middle part of their bodies. Specimens collected in Ireland, Scotland or Wales, perhaps when you are on holiday, would be particularly valuable as records from these regions are more difficult to obtain. You do not have to be able to identify the insect to help in this scheme.

The value of the distribution maps will depend to a great extent upon the help that is obtained, and we hope that a large number of people will be able to provide specimens so that detailed and up-to-date maps can be made.

If you would like to become more deeply involved in this scheme by collecting over several 10 km squares please write to me at above address.

M. E. Archer

A FURTHER NOTE ON THE LESSER SWALLOW PROMINENT

Mr. Waddington's notes on *Pheosia gnoma* Fab. in last November's Bulletin, prompt me to recall the only two larvae I myself have ever found. In 1970, on October 8, I found a single larva on Birch near Halstead in Kent. This went to earth two days later. A female moth emerged on July 6 the following year.

On September 26, two years later another came my way, however despite forming its cocoon, the pupa failed to produce a moth. The point Mr. Waddington makes as regards sleeving the larva when full grown is interesting, maybe my first larva being almost ready for pupation did not object to indoor life for a couple of days. This is as far as my experience with this species goes to date, I have yet to find a first brood larva.

J. Platts (4300)

AES MIDLANDS GROUP NOTICE

We are pleased to announce that the AES Midlands Group is being re-formed and reorganised. We held our first committee meeting with our new committee on March 12th, and hope that the various suggestions put forward will enable the Group to get off the ground once more. We shall hold committee meetings monthly, and endeavour to issue our Newsletter quarterly. We trust that new members will join to swell our ranks, and we already have lined up some Group joint activities in the field during the coming season, including a week in the New Forest and a week on the Norfolk Broads.

Would interested AES members who would like to join the Group please write to the Leader, David A. Tilley (5206), 36 The Crescent, Northampton, giving details of age, interests and so on. Please note that this group does not confine its attention solely to insects—we are also interested in general natural history, ecology, amphibians, reptiles and fishes, plants and so on. Juniors are very welcome! We hope to publish a quarterly report of our activities in the Bulletin, and an Annual Report every year. You can meet us, too, at the AES Exhibition!

D. A. Tilley (5206)

AES EXOTIC ENTOMOLOGY GROUP

The "Exotic Entomology Group" is the revised (1970) title for what was the "Silkmoth Rearers' Study Group", founded by Mr. C. J. Hamilton (3890) in the mid-60s.

Readers of the AES Handbook on silkmoths will be aware that the 'mother' Society has long had a following of 'exotica' devotees, whose activities seem to flare up into some concerted action on occasion—the compilation of the Handbook itself is a notable example—only to subside once more into prolonged and unproductive silence. The S.R.S.G. gave an incentive for correspondence and exchange among its members, but it was soon clear that enthusiasm for 'exotic' insects was not confined to the Saturniids—hence the change of style in order to cater for a broader spectrum in entomological and related interests, which now includes Phasmids, Mantids, other Lepidoptera, Arachnids, Myriapods, etc.

The term 'exotic' is a highly debatable and tenuous one—after all, British species that appear commonplace to British entomologists might well fall within the realms of the 'exotic' to, say, American or Japanese enthusiasts, and vice versa. It would be reasonable to assume that there is less emphasis on British species (which are already well covered by the Bulletin), although these are not necessarily excluded by the term; 'foreign' is too ambiguous; 'tropical' too confined and 'world' somehow lacking in redolence. Perhaps the word should be left to individual inter-

pretation, the excuse for its usage being that 'Exotic' Entomology Group, rather than any other prefix, leaves a little more scope for the imagination?!!

The aims of the Group are now seen as:

1. Stimulating an interest in, and increasing our knowledge of, all insects and other land arthropods.
2. Learning new, and improving upon old, rearing and breeding techniques, especially for the more unusual and rare species (a conservation aspect is, therefore, implicit).
3. Establishing contact with overseas enthusiasts, for first-hand information.
4. Encouraging correspondence among members for exchange of information and livestock.

These objects apart, and although the Group is not without a fair sprinkling of members who possess special scientific skills, it is probably true to say that most members have few or no studious pretensions—learned treatise on Tipulid antennal structure or microlepidopterous genitalia would leave us cold, but our excitement would be ill-suppressed at the first hint of a *cecropia* or a *luna* breaking its pupal bonds to blossom into full 'moth-hood'; to us, the moulting act of a giant stick-insect is greeted with an awestruck fascination, whilst a glimpse of a 'bird-eating' spider or a Goliath Beetle would serve to give our chromosomes an extra twist!

But these things are things of the soul which rarely find written expression; thus it was that contributions to the Group's quarterly Newsletter were painfully slow to come, with the result that this means of universal contact among members failed to 'eclose' throughout 1972—the potential was there, but it remained untapped.

1973-4 has seen the efforts of newly-appointed officers in trying to revive activity: Mr. D. J. Moon (3850) assumed the dual responsibilities of Secretary from Mr. Hamilton and of Editor from Mr. B. G. D. Wraxall (4154). At Mr. Moon's request, Mr. C. J. Eschbacher (3731) very kindly agreed to take up the duties of treasurer. In a primarily correspondence-based study group, it was felt that the quarterly newsletter should continue to act as the principal record of activity—this periodical was therefore re-born on a more ambitious scale, the issues for 1973 alone containing 130 pages of material, which comprised major articles, reviews of books, broadcasts, the trade, wants and exchange, extracts from correspondence, crosswords and, perhaps most significantly in terms of stimulation, illustrations. At first it was necessary for the officers themselves to stoke up the Newsletter, but it wasn't long before members got the message and contributions started to pour in. This step-up in the EEG literature also witnessed a corresponding increase in the membership, from 41 at the beginning of 1973 to 63 at its end, the old

annual subscription of 25p having been retained for that year. Many of the new members were 'recruited' at the AES Exhibition, where the Group put on a modest display, testing the ground for a much larger one this year.

The new-style bulky Newsletter had been successful enough to justify its potential for further growth, but, in order to maintain the same quantity and quality of output in 1974, it became necessary to raise the subscription to a still modest 75p, since the old sub. had covered postal costs only—the result of this increase was a drop-out of 30 members! (strange how dealers' price-lists, at the same or greater cost, are snapped up more eagerly) However, at the time of writing (May 30th), the numbers have almost returned to their previous level because of response to the Group's advert in the February '74 Bulletin. The membership now stands at 58; most members are resident in Britain, with others in Nigeria, Zambia, Belgium and Germany. Enquiries from the U.S.A. give hope of further diversification. Last year, almost half of our members did not belong to the AES; this year they amount to about one-third non-AES. Although EEG is run as a study group of the Society by its officers, it has a quite separate financial identity. With authors' permission, the Society is free to avail itself of any material that appears in our Newsletter ("Cockroach Culture" by Mr. P. S. Clark in the November '73 Bulletin, is one example); therefore, the study group can be seen to benefit AES, if only as an additional source of articles for publication!

Eventually it is hoped to widen the range of EEG activities beyond its present function as a correspondence and exchange group—local meetings, the formation of sub-groups (e.g. Phasmod/Mantid Groups, etc.); small provincial exhibitions and displays which are complementary to the AES Exhibition, are all possibilities.

We look forward to meeting as many of our members as possible, as well as any other AES members who may be interested, at the Annual Exhibition shortly. Come along to our table—we feel sure you won't be disappointed!

D. J. Moon (3850)

SOME COMMENTS ON THE SEASON OF 1973

After a most disappointing season in 1972 I was hoping for a good year and I was delighted to find it proved to be an enjoyable and successful year.

The season started well when I was most surprised to find a Grey Shoulder-knot (*Lithophane ornitopus* Hübn.) resting on a fence at Chippenham in Wiltshire. This was January and was rather surprising since we were in the midst of a cold spell—not the time one would expect to find hibernators appearing.

I was putting out my trap regularly but nothing interesting came until May 27 when a Chamomile Shark (*Cucullia chamomillae* Schiff.) turned up at Epsom College. This was my first encounter with this species. On June 6 the Light Brocade (*Hadena w-latinum* Hufn.) put in its first appearance at Epsom while on June 8 a Beautiful Brocade (*Hadena contigua* Schiff.) turned up. Both species had been previously recorded but it is always pleasant to see these two.

On the weekend of June 10/11 I went back to Chippenham and ran my trap in a nearby wood, Bird's Marsh. On the first night I was delighted to record a couple of Waved Umbers (*Menophra abruptaria* Thunb.) and a couple of Lobsters (*Stauropus fagi* Linn.) On June 11 at the same locality I found a Lunar Thorn (*Selenia lunaria* Schiff.) together with a Least Black Arches (*Nola confusalis* H.Sch.). All of these were new to me and confirmed my suspicions that this wood was really quite a good one.

Back at Epsom the next interesting species was a Golden Plusia (*Polychrysia moneta* Fab.) I had found this species before at Epsom—one in October 1971.

June 25 turned out to be really good and as always happens this was the only time I let someone see to the trap because I was too busy studying for my 'A' levels. With great luck they took a Blotched Emerald (*Comibaena pustulata* Hufn.) and even better a Dew moth (*Setina irrorella* Linn.). The latter was only collected by mistake since they thought it was a micro, but it fell off when they collected another larger moth!! Both of these were new to me but *S. irrorella* was of most interest since it has a very limited distribution and had not been recorded from Epsom for a very long time.

Nothing else of interest occurred till I paid another visit to Bird's Marsh Wood on June 30. To my great delight a Clay Triple Lines (*Cosymbia linearia* Hübn.) turned up. I had recorded two the previous year but it appears to be very local in the wood and so I was delighted to find it again.

On July 3 I had a really wonderful night with Bob Wallis at Tilgate Forest, Sussex. We used his M.V. lamp and despite a cloudless night the moths seemed quite active. We had a wonderful time and amongst the most interesting species to turn up were the Orange moth (*Angerona prunaria* Linn.), Marbled White Spot (*Lithacodia fasciana* Linn.), Satin Lutestring (*Tethea fluctuosa* Hübn.), Great Oak Beauty (*Boarmia roboraria* Schiff.) and the Beautiful Snout (*Hypena crassalis* Fab.). I can assure you that we were all delighted with our outing—I only hope I will get an opportunity to pay the wood another visit sometime.

On July 4 I was again lucky enough to go out with someone, this time Mr. J. D. Wakely. We visited several areas around East Horsely, Surrey. This was especially pleasing since I had visited most of the places before but many years ago when my Aunt used to live there. The weather was

similar to the previous night but very little was flying. At one spot two Waved Carpets (*Hydrelia testaceata* Don.) were attracted, which was of some consolation, being new to me. When we retreated to garden I found two of my great favourites around his trap—the Scarce Silver Lines (*Pseudoips prasinana* Linn.) and the Rosy Footman (*Miltochrista miniata* Forst.).

Over the next few days I was in Merionethshire and Snowdonia in Wales doing a 40 mile hike for the Duke of Edinburgh Award. As we were going to walk in the mountains I had high hopes of quite an interesting time. This was not to be the case for we experienced horrid weather for most of the time with mist, drizzle and heavy winds being the order of the day—in fact typical Welsh weather. One evening while stumbling rather late to our camp site I did spot the amazing pendulum like flight of a Ghost Swift (*Hepialus humuli* Linn.). However it did clear suddenly on July 10 while we were negotiating a rather overgrown path along a river, the Afon Gamlan, Trawsnant. I was stunned to find myself surrounded by dozens of Pearl Bordered Fritillaries (*Clossiana euphrosyne* Linn.), this was the first time I had seen this in Britain and after such a spartan few days it was really delightful. I was also amazed at their great docility being able to pick them up with our hands.

On July 12 I set my last trap at Epsom College, and so was particularly pleased to have a good catch of over 500. I was delighted to record the Dark Scallop (*Philereme transversata* Hübn.) and the Lappet (*Gastropacha quercifolia* Linn.). I had heard that the Lappet was to be found in the area but all searches for the larvae had proved fruitless so it was particularly gratifying to get it at last. I will greatly miss these traps now that I have left for Bristol University. In the two and a half years I ran the trap, remembering it was only during term time and usually only three days a week, I recorded 272 species which shows what a wonderful area it is. The species were still being added to right up to the last, so this figure is clearly an underestimate for the area. Frequently in the summer I got catches of over 500 moths and 60 species. In passing I should mention that just by the College there is a very strong colony of the Small Blue (*Cupido minimus* Fuessly). In previous years this had been very scarce and restricted to the Downs but in 1973 it was by far the commonest butterfly, even being seen regularly in the grounds of Epsom College, where I had not previously observed it. Anyway, on to pastures new and I hope I have as much success at Bristol.

On July 18 I started a weeks course at Nettlecombe Court, Somerset—a course run by Mr. J. Heath of Monks Wood Experimental Station on butterflies and moths. As usual I thoroughly enjoyed myself, with several interesting species cropping up. The highlights for me were the Double Line (*Mythimna turca* Linn.) and the Pinion Streaked Snout (*Schrankia*

costaestrigalis Steph.). There were many other interesting species including the Spruce Carpet (*Thera variata* Turn.), Cloaked Carpet (*Euphyia picta* Hübn.), Beautiful Carpet (*Mesoleuca albiaillata* Linn.), Welsh Wave (*Venusia cambrica* Curt.), Dotted Carpet (*Alcis jubata* Thunb.) and a Great Prominent (*Notodonta trepida* Esp.) larva, which I subsequently heard proved to be parasitised. All in all it was a most enjoyable week.

On July 25 I was back at Chippenham and visited Bird's Marsh Wood as well as running the trap in my garden. In the garden the Slender Clouded brindle (*Apamea scolopocina* Esp.) turned up, while at Bird's Marsh Wood the Buff Footman (*Lithosia deplana* Esp.) was recorded. The former I had not seen before.

On July 26 I again visited the wood and found a fine Large Emerald (*Geometra papilionaria* Linn.) together with a Satin Beauty (*Deileptinia ribeata* Clerck.). The former was no real surprise but the latter was rather unexpected.

The following day I was up in Keyworth, Nottinghamshire and managed to run the blacklight in a back garden. There was one species new to me—the V moth (*Itame wauaria* Linn.). I am surprised I had not come across it before.

August started with two old favourites turning up. At Bird's Marsh Wood the Beautiful Tissue (*Triphosa dubitata* Linn.) payed a short visit to the trap while the garden trap produced a Marbled Green (*Cryphia muralis* Forst.). This year the latter was particularly numerous appearing at the trap on many nights. The Double Lobed (*Apamea ophiogramma* Esp.) made its way to the trap on August 3—a species I had been hoping for for some time but had rather given up hope.

After a rather boring week another new species turned up at the wood—the White Spotted Pug (*Eupithecia tripunctaria* H.-Sch.) and an old friend renewed its friendship—the New Copper Underwing (*Amphipyra berbera* Rungs). Two days later I was delighted to find at the garden trap the Dusky Sallow (*Eremobia ochroleuca* Schiff.) which is still on the increase in the west. Another dull week passed before something else interesting turned up—the Ear Moth (*Hydraecia oculea* Linn.).

Something special happened on August 27. After a boring night at Bird's Marsh Wood, over which I was feeling rather despondent, for some odd reason I stopped while passing our gate post on the way home and only then realized that there was a very large moth on it. At first I thought it must be a rather late Privet Hawk (*Sphinx ligustri* Linn.) but was delighted to find it was really a Convolvulus Hawk (*Herse convolvuli* Linn.). This cheered up rather a dull time of year.

On September 2 I arrived on Skomer, an island off the Welsh Coast. I had no idea what to expect, but was delighted at what I found. I took my blacklight with me and ran it at various spots on the island.

The first night resulted in the Autumnal Rustic (*Paradiarsia glareosa* Esp.), Frosted Orange (*Gortyna flavago* Schiff.) Heath Rustic (*Amathes agathina* Dup.) Square Spot Dart (*Euxoa obelisca* Sciff.) and finally Black Banded (*Antitype xanthomista* Hubn.). This was a wonderful start and included four species new to me. Nothing interesting was seen during the day and the night resulted in much the same species as previously. There was the odd occurrence of a Red Admiral (*Vanessa atalanta* Linn.) in the trap. There were literally hundreds on the Island at that time with a very good migration—but it still seems odd to get one in the trap.

September 4 was a really great night, an incredible 712 moths being attracted to a mere blacklight. The species included the Crescent Dart (*Agrotis trux* Hübn.), Scarce Bordered Straw (*Helothis armigera* Hübn.), Marbled Green (*Cryphia muralis* Forst.) and the Mullein Wave (*Scopula conjugata* Borkh.). All in all most gratifying—especially the *H. armigera*. A very large proportion of the 300 odd trapped *A. agathina* were of the form *ab. rosea* which seems rather peculiar.

I had some more excitement the following day when I was walking round the island with a Tilley lamp—finding two perfect Vestals (*Rhometra sacraria* Linn.) on some ragwort. This really confirmed what a wonderful migration year it was proving to be. A few yards further on I caught a further *A. trux* which added to my amazement. The trap for this night is not worth mentioning—it was knocked over and the contents spilt by young sherewaters and the battery had gone flat! On the last night I recorded the Feathered Ranunculus (*Eumichitis lichenea* Hübn.) which was a good way to end.

So I left Skomer after one of the most enjoyable weeks of my life—and not only for entomological reasons! It will not surprise you to know I am going back next year; this time July 20-26 so I hope for more success.

After this the rest of the season could only be an anticlimax. On September 23 I was pleased to find the Black Rustic (*Aporophyla nigra* Haw.) on a pine tree in the New Forest, and the same species much to my amazement at my garden trap at Chippenham on October 1. To end the season as I had started, another *L. ornitopus* was found on a tree near my house.

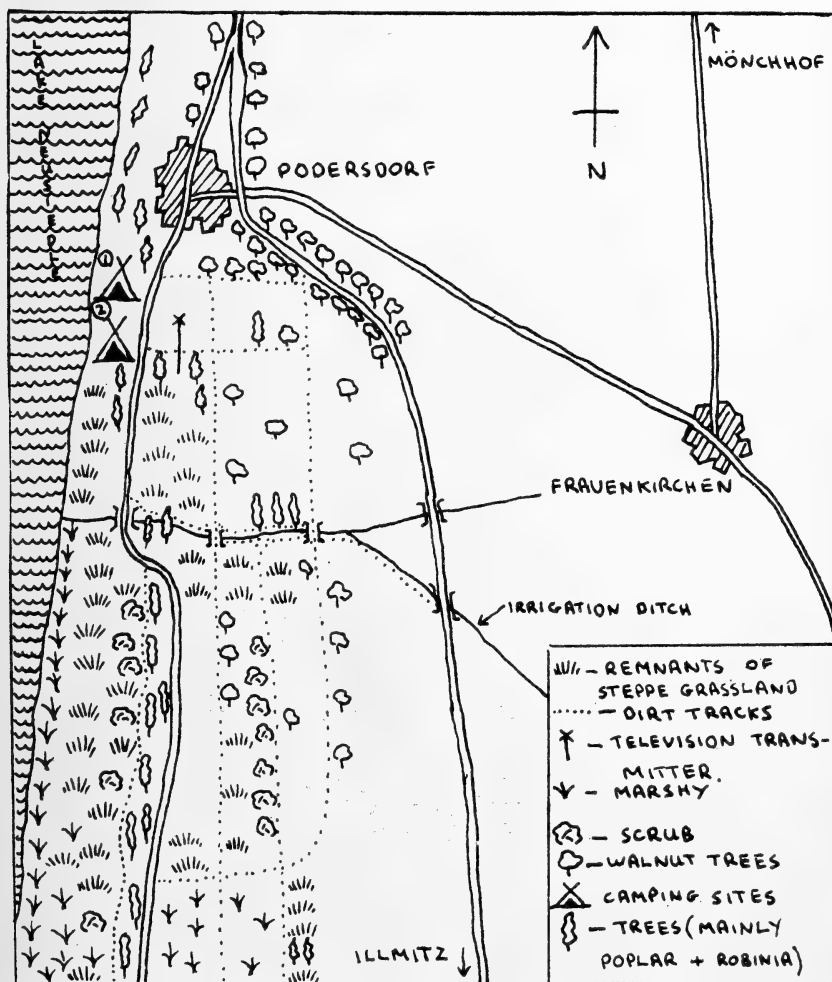
Nothing else of interest was found but I will have many memories of a great season. Despite having the pressures of 'A' levels and not being able to do any real entomology in the months of May and June I had found many more interesting species than other years. I hope 1974 treats us all the same way as last year!

P. M. Heath (4167)

AN EXPEDITION TO EASTERN AUSTRIA— JULY/AUGUST 1975

I departed, by car, from my London home on the 22nd July in time to catch the Dover-Ostend car ferry later that day. After an uneventful Channel crossing, I arrived in Ostend on the morning of the 23rd and set off for Lake Neusiedle in E. Austria, travelling by motorway via Antwerp, Cologne, Nürnberg, Vienna, arriving in Podersdorf (see map) on the 27th.

The only noteworthy experience, butterflywise, on the downward journey, was a Japanese Privet, *Ligustrum ovalifolium*, which was



flowering in one of the Belgium motorway parking places. On it were 4 Small Tortoiseshells, *Aglais urticae* L., 2 Speckled Woods, *Pararge aegeria* L., 4 Red Admirals, *Vanessa atalanta* L., 1 White Admiral, *Limenitis camilla* L., 1 Ringlet, *Aphantopus hyperantus* L., 2 Brimstones, *Gonepteryx rhamni* L., and 3 Map butterflies, *Araschnia levana* f. *prorsa* L. which were considerably larger than the ones I found later on in S.E. Austria.

I used camping-place (2) as a base from which to explore the surrounding countryside. The area to the east of Lake Neusiedle was marsh and steppe grassland ten years ago, but now most of it is under wine cultivation and holiday villas.

The first area I visited was a strip of grassland along the north side of the irrigation ditch, going from the lake to where the ditch forked. The weather was very hot and sunny, the temperature being over 30°C so I was attired only in swimming trunks and sandals. Several Six-spot Burnets, *Zygaena filipendulae* L. were buzzing around a patch of thistles, *Cirsium* sp., and many Pale Clouded Yellows (*Colias* sp.) were flying around, especially over the fields of Lucerne, *Medicago sativa*. In a stand of 5 Lombardy Poplars, *Populus nigra*, a large female Greater Poplar Longhorn beetle, *Saperda carcharias*—was found excavating a hole in the bark of one of them. Amongst the Poplars was a defoliated Black-thorn bush, *Prunus spinosa*, at the base of whose stem three large cocoons of the Giant Emperor moth, *Saturnia pyri* Schiff., were found firmly attached. Next to the Poplars grew an *Ailanthus* tree, which was searched for larvae of *Philosamia cynthia* Drury, which occurs in this area, but none were forthcoming. It was just after midday as I started north along one of the dirt tracks. A number of female Large Coppers, *Lycaena dispar rutilus* Wern., and a Queen of Spain Fritillary, *Issoria lathonia* L., were seen feeding from a clump of Hemp Agrimony, *Eupatorium cannabinum*, which grew beside the track. Pale Clouded Yellows, *Colias hyale* L., and Clouded Yellows, *C. crocea* Geof., abounded. Towards 3 o'clock I started back towards base, passing the television transmitter on the way. A cold shower and a rest brought that day to a close.

Next day the thermometer was already over 25°C as I set off for the small areas of grassland either side of the road which ran between the camping site and the irrigation ditch. Flowers abounded as did vicious Spiny Restharrow shrublets, *Ononis spinosa*, around which Common Blues, *Polyommatus icarus* Rott., flitted. Here and there small Willow, and Poplar trees occurred upon which Poplar and Eyed Hawk, *Laothoe populi* L. & *Smerinthus ocellata* L., larvae were feeding. Many small Peach trees had sprouted in this area from discarded peach-stones; ova and small larvae of the Scarce Swallowtail butterfly, *Iphiclidides podalirius* L., were found on them, the larvae looking like little black horses with green saddles.

On a solitary Cherry tree I saw what I thought was a larva of *Deilephila alecto* L., but it turned out to be of a Lime Hawk, *Mimastilia* L. I also looked over several shrubs and trees of the introduced *Robinia pseudacacia* and *Elaeagnus angustifolia*, but nothing was found.

The next day was Sunday and it became very hot; the temp. eventually climbing to 37°C. Because of the heat I decided to investigate the strip of trees which ran down part of the road nearest the lake. Jersey Tiger moths, *Euplagia quadripunctaria* Poda., were found feeding on a clump of Hemp Agrimony. Wall Browns, *Lasiommata megera* L., flew in the shade of the trees and Sharp-angled Peacock moths *Semiothisa alternata* Müller resting on the tree foliage. Along the eastern side of the wood many large adults of the Ant-lion, *Acanthacris occitanica* L., were found resting on the wire of a fence. A Praying Mantis, *Mantis religiosa* L., was also found, sunning itself on a shrub. Coming back to this area at dusk, suitably dressed, large numbers of Mole-crickets, *Gryllotalpa vulgaris* L., were seen flying clumsily about. This was the last time I ventured out at night, being nearly eaten alive by mosquitoes on this occasion.

On the following day I surveyed the area of land bordered by Podersdorf in the north, the two southerly roads to the east and west and by the irrigation ditch in the south. Amongst the grape-vines grew many Walnut, Cherry and Plum trees. The latter two were searched and a few Giant Emperor moth larvae were found on bare twigs where they had been feeding. By chance I discovered that this species was also feeding on the Walnuts. Armed with this knowledge I searched the bases of the Walnuts lining the road to the south-east of Podersdorf. On the 18 trees, 37 cocoons were found and the road was covered with the squashed bodies of larvae. I also noticed that cocoons only occurred at the base of trees which had grass growing up against them; the larvae using it to support the cocoon while it is being spun.

On one of the trees I removed a piece of dead bark and found a fine 5cm long female example of the rare European longhorn beetle, *Megopis scabricornis*. On this day a plague of Seven-spot Ladybirds occurred and because of a lack of food they were even attacking people.

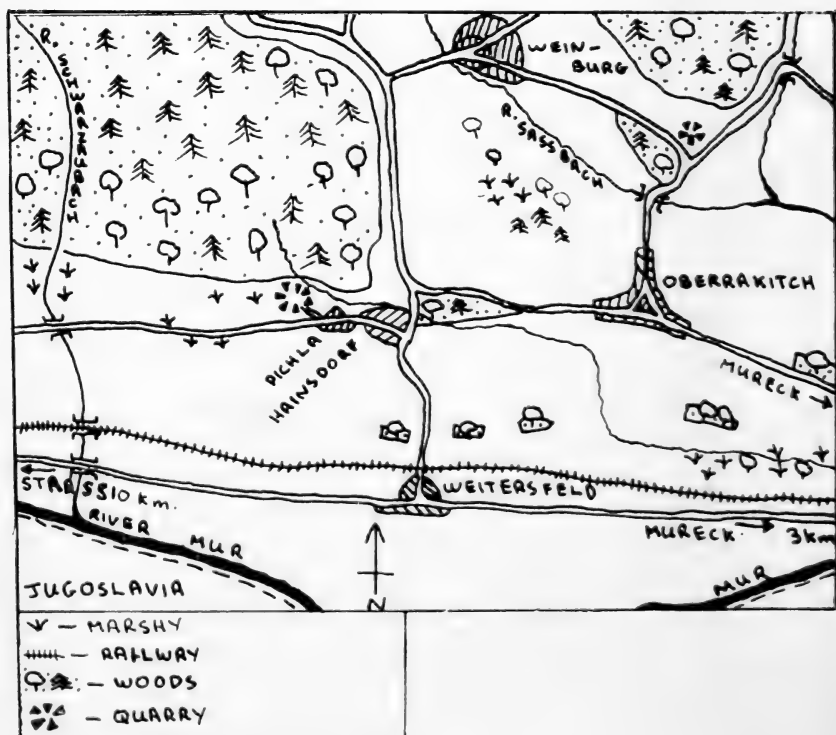
Returning to the camping-site I stopped to examine a clump of Cypress Spurge. *Euphorbia cyparissias* L., and found 3 brightly coloured larvae of the Spurge Hawkmoth, *Hyles euphorbiae* L.

Over the next three days I made numerous sorties, in sweltering weather, into that area of land bordered by the irrigation ditch in the north and by the two roads to the East and West. Many fresh Common Blues, Queen of Spain Fritillaries, Clouded & Pale Clouded Yellows and a few unidentifiable Burnets were seen. A Bath White, *Pontia daplidice* L., was also seen flying around a clump of Mignonette, which is its larval foodplant.

On a wild rose bush, ova of Central European Lappet moth, *Odonestis pruni* L., were found.

On the Friday I set off down to southern Austria to a small village called Hainsdorf, where I was to stay at a farmhouse. I arrived there in the evening. The vegetation in this area was much more luxuriant due to the much higher rainfall. In between doing farm work I also made many sorties into the surrounding countryside, by bicycle, to collect livestock, to photograph and to observe.

The first area visited was the quarry above Pichla. Hay meadows, rich in flowers, backed onto the forest. Along the forest's edge the North American Goldenrods, *Solidago canadensis* L., were in bloom, which attracted many butterflies, especially of the family Lycaenidae, such as *Palaeochrysophanus hippothoe* L., *Heodes tityrus* Poda. *Lycaena phlaeas* L., and *Everes argiades* Pal., as well as the fritillaries, *Argynnis paphia* L., and *Mellicta athalia* Rott., and Map butterflies. Flying along the forest edge Wood Whites, *Leptidea sinapis* L., Speckled Woods and the occasional Camberwell Beauty, *Nymphalis antiopa* L., could be seen. In the hay meadows *Minois dryas* Scop., Ringlets and Small Pearl-bordered Fritillaries. *Clossiana selene* Schiff., were seen. Alongside the



road which led westwards away from Pichla, ran a marshy ditch. Several female Large Coppers were seen here feeding from Annual Fleabane, *Erigeron annuus*; another North American plant. On nearby Aspen Poplars, *Populus tremula*, larvae of the Pale Prominent, *Pterostoma palpina* Clerck, occurred.

Another area visited was the wooded park situated between Hainsdorf and Oberrakitch. Here on one occasion, a male Purple Emperor, *Apatura iris* L., flashed past, glinting a beautiful purple in the sunlight. Along the edges of the wood, always keeping to the shade, both *Neptis sappho* L., and *N. rivularis* Scop., flew gracefully, the latter stopping occasionally to sip nectar from the flowers of its foodplant; a white flowering species of *Spiraea*. Many Silver-washed Fritillaries flew along the sunlight dappled paths as did the occasional *Mesoacidalia aglaja* L. Sometimes a Tanner Longhorn beetle, *Prionus coriarius* L., would cross a path in front of me, chirping loudly when touched. This species is quite common in Epping Forest, next to which I live.

Surrounding the Park were Blackthorn thickets from which I collected Scarce Swallowtail larvae. While doing so, Brown Hairstreak butterflies would sometimes flash past seemingly doing much! Growing in one of these thickets was a North American Red Oak, *Q. rubra*, upon which a Lime Hawkmoth larva was feeding. Not far from this tree was an avenue of Large-leaved Limes, *Tilia platyphyllos*, covered in Common Firebugs, *Pyrrhocoris apterus* L.

Many visits were made to the small marshy area, next to the Sassbach, between Weinburg and Oberrakitch. Here, along a ditch overgrown with Docks, many male Large Coppers were flying. I chased one around for 45 minutes, obtaining 3 fine photographs in the process. In this area were also many hay meadows where the following were seen:—Commas, *Polygonia c-album* L., Map butterflies, Speckled Woods, Ringlets which were feeding from Alder Buckthorn, *Frangula alnus*, flowers. Silver-washed, Heath, Small pearl-bordered and High Brown Fritillaries, *Fabriciana adippe* Schiff. Tufted, *Carcharodus flocciferus* Zell., Large, *Ochlodes venatus* Tur., and Small Skippers, *Thymelicus sylvestris* Poda. Purple-edged, Sooty and Small Coppers. Common, Short-tailed and Mazarine Blues, *Cyaniris semiargus* Rott. Both the Scarce and the Dusky Large Blues, *Maculinea teleius* & *M. nausithous* Berg., could also be found, perched atop the flowerheads of their foodplant, *Sanguisorba officinalis*. Wood Whites, Clouded and Pale Clouded Yellows abounded. The occasional Swallowtail, *Papilio machaon* L., was also seen, feeding from Clover flowers. Cardinals, *Pandoriana pandora* Schiff., raced up and down the trees lining the stream and the Green-veined White, *Pieris napi* L., Small, *P. rapae* L., and Large Whites, *P. brassicae* L., looked like a summer snowstorm.

Once when coming back from this area, I stopped beside the road to examine a Sallow bush and a very large female Purple Emperor alighted and began sunning herself. Further on a Stag Beetle, *Lucanus cervus* L., was trying to right itself at the base of a house wall. Around this area the beautiful metallic green Rose Beetles, *Cetonia aurata* L., could often be seen flying about.

Another area visited was the water-meadows to the S.E. of Oberrakitch. Many flowers occurred and within them myriads of butterflies. The only new species found was the Violet Fritillary, *Clossiana dia* L. Several large Blue Carpenter-bees, *Xylocopa violacea*, with their dark metallic blue bodies and translucent blue wings were seen visiting the Thistles *Cirsium oleraceum*. A Fuller Beetle, *Polyphylla fullo* L., flew noisily across a clearing in a nearby wood as I was searching a patch of *Aristolochia clematitis* for *Zerynthia polyxena* Schiff. larvae, but none were found.

From this area I often used to cycle up to the quarry above Oberakitch where, on one occasion, a Large Tortoiseshell butterfly, *Nymphalis polychloros* L., was captured and one of its larvae found, feeding on Cherry. Comma larvae were very common on the Sallow bushes which ringed the quarry.

Many times I went up into the forest to the north west of Hainsdorf to collect mushrooms. Dark Crimson Underwings, *Catocala sponsa* L., flew from tree-trunk to tree-trunk at my approach, as did the occasional Great Oak Beauty, *Boarmia roboraria* Schiff. Sometimes a cocoon of *Antheraea yamamai*, Guérin Mén., was found, torn open by Crows in search of a meal. Once, on coming to a sunlit glade, a Marbled Fritillary, *Brenthis daphne* Schiff. was seen sunning itself on its foodplant; Bramble, while Scotch Arguses, *Erebia aethiops* Esp., danced above the grass.

In the general area around Hainsdorf, because of the abundance of still water. Damselflies were very common. I saw Banded Agrions, *Agrion splendens*, Harris; Lake Demoiselle-flies, *Agrion virgo* L. Common Damselflies, *Coenagrion puellum* L.

On the shrubs edging these waters, many moth larvae were seen as was a lovely example of the Alpine Longhorn beetle, *Rosalia alpina* L. Also, every Nettlepatch was crawling with Peacock Butterfly larvae, *Inachis io* L.

Amongst the cultivated fields larvae of the Small Elephant Hawk, *Deilephila porcellus* L., were found feeding in conjunction with Elephant, *D. elpenor* L., and Humming-bird Hawks, *Macroglossum stellatarum* L., on Bedstraw, *Galium* sp. Swallowtail larvae could be seen on Wild Carrot, *Daucus carota*. Narrow-bordered Bee Hawk-moths, *Hemaris tityus* L., were often observed feeding from Bugle, *Ajuga* sp. When harvesting potatoes, besides Colorado beetles, *L. decemlineata*, many

Carabids, especially *Carabus granulatus* L., scurried away from the hoe and a few Great Green Long-horned Grasshoppers, *Tettigoniella viridis* L. took flight.

The streets of Hainsdorf were lit by 80W mercury-vapour bulbs on telegraph poles. Many insects were attracted to these:—*A. yamamai* (mainly males) Eyed, Lime, Elephant, Privet, *Sphinx ligustri* L., Pine, *Hyloicus pinastri* L., Convolvulus, *Herse convolvuli* L., and Small Elephant Hawk-moths. Oak, *Lasiocampa quercus* L., and Grass Eggars, *L. trifolii* Schiff., (females). Rosy Underwings, *Catocala electa* View., and on one occasion, an orange underwing with marbled, grey forewings. Dewick's Plusia was very common, *Plusia confusa* Steph. Many more species were seen; too many to be listed here. Beetles were also attracted, especially the Great Silver Water-beetle, *Hydrous piceus* L., and the Fuller. Hornets, *Vespa crabro*, made boxing any of the above very dangerous.

On many occasions, when coming back from the lights, swaying pinpricks of light would pass me, as male Glow-worms, *Lampyrus noctiluca* L., went in search of their wingless mates.

I left Austria towards the end of August, arriving back in England on the 2nd of September with much livestock and a deep sun tan.

A. R. Pittaway (4802)

SOME OBSERVATIONS MADE IN THE ALGARVE (PORTUGAL) ON CONTINENTAL RHOPALOCERA IN APRIL 1972

Whilst spending an enjoyable fortnight's holiday with my wife and young daughter in a villa in the Luz Bay Club lying to the west of Lagos, I was able to carry out a brief survey of certain species of Lepidoptera as a result of which I thought it worthwhile to set out my general observations. However, before doing so, I consider it would be helpful if I were to describe the particular habitat and terrain within the vicinity where we were staying. In the immediate vicinity of the Club the land is largely under cultivation—that is to say in local Portuguese fashion—with small orchards of aged fig trees, their branches drooping to the ground in characteristic fashion, and small almond trees. The ground between the trees was found to be intensely cultivated with certain cereal crops and broad beans. However, I found large areas of waste land or previously cultivated land which had been allowed to become overgrown with perennial weeds, particularly close to the Club on a spur of headland which rose to a distinctive plateau area which was covered with dense bushes of *Cistus* (*Cistus albidus*) and a few bushes of a variety of buckthorn. The ground area, particularly towards the cliffs at the base of the plateau were covered with varieties of thyme,

lavender and certain leguminous plants. In this particular area I sighted many Swallowtails (*Papilio machaon* L.) in flight which were elusive to catch owing to their fast zigzag flight pattern. In view of the period of sighting, all imagines would have been first brood insects. On many occasions I also saw a few male Cleopatra Brimstones (*Gonepteryx cleopatra europaea* Vty.).

Unfortunately again owing to fast flight habit I was unable to catch any specimens for closer identification, although I was able to observe the beautiful orange flush colouration present on the upper sides of the forewings. On one hot afternoon I saw two females, which do not display the orange flush areas on the forewings and are in fact much paler in general colouration than their male counterparts.

During the second week of my holiday on the 19th April whilst spending an hour or two in the hillside area lying to the base of the plateau behind the Club I was fortunate enough to find two fine male imagines of the Spanish Fritillary (*Euphydryas desfontainii baetica* Rbr.). This attractive butterfly resembles the Marsh Fritillary, but on closer examination it will be found that the general markings and colouration are more pronounced and less suffused in character than those of the Marsh Fritillary. Furthermore, this species is distinctly larger in size and is certainly a most handsome insect when freshly emerged. In view of the limited number of this species found throughout the period of my holiday, I have come to the conclusion that all imagines sighted were early emerged specimens. Also on the 19th April I found in the same area one isolated Aetherie Fritillary (*Melitaea aetherie* Hbn). This particular butterfly was found at mid-day fluttering in a somewhat helpless manner close to the ground and was soon ensnared without difficulty. At first I identified this specimen as being a female Spotted Fritillary (*Melitaea didyma* Esp.), and it was only after further examination of the undersides of the hindwings that I realised my original error of identification. The specimen was in very good condition and once again newly emerged. It is perhaps worth mentioning that this particular specimen displayed a bright orange fulvous general colouration on the upper sides of both the fore and hind wings with only intermittent black markings in the post discal and marginal areas of the upper sides.

On a few occasions my wife and I with the benefit of a hired car were able to explore the foothill region of the Monchique Mountains, which was found to be most worthwhile. This region of the Algarve comprises areas of poor sandstone soil which is largely uncultivated and covered extensively with Gum Cistus and Laurel-leaved Cistus with abundant Cork Oak trees.

The lower slopes are cultivated with citrus fruit trees and almond

trees. Many of the inland roads were flanked with species of mimosa (Acacia) and Judas trees (*Cercis siliquastrum*) in full flower providing a most spectacular and colourful sight. The ground area is densely covered with lavender, mediterranean heath and many other varieties of small shrubs and low growing plants. I found on our visits that the Gum Cistus was just coming into flower, a truly magnificent sight in view of the handsome quality of this pure white, rose-like flower with striking purple blotches in the basal areas of the petals, although, alas, each bloom barely lasts twenty-four hours. On our first visit to this region, we stopped at a small picnic area by the side of the road leading to Silves, which forks off the main road from Portimao to the town of Monchique, and within a few minutes I observed my first Spanish Festoon (*Zerynthia rumina* L.) imago in flight. This butterfly must surely be ranked as one of the most attractive species of the Papilionidae found in Southern Europe in view of its delicate colouration and markings.

It was soon apparent to me that I was fortunate to have stumbled upon an extensive colony which had fully emerged and was at the height of its short season. This species is one of the earliest to appear on the wing and will be found throughout the region during April and early May. I succeeded in catching a small number of specimens, all of which were found to be in very good condition and displayed the distinctive red spots on the uppersides of both the fore and hind wings. I recorded only minor variations in the general pattern of markings, although some imagines did appear to have paler red or pink spots on the forewings due possibly to age and extended exposure to strong sunshine. This butterfly flies in a somewhat lazy gliding and soaring fashion, and although it does not appear to demonstrate any strong characteristics of flight, surprisingly enough I found this species irritatingly difficult to catch at times!

On our second visit to the same area above Portimao I was able to observe a female Spanish Festoon imago laying ova on a food plant, which I subsequently identified as a variety of *Aristolochia*. I hastened to inspect as many plants as I could find and soon discovered that either young larvae in their first instar or single ova laid on the undersides of leaves were present on practically all plants. I did in fact collect a few larvae and ova with the appropriate food plant before returning to our villa, and I was most intrigued to discover how quickly the young larvae grew in size and changed skins. By the time we were ready to depart from our villa, many larvae had reached their last instar and would have pupated without difficulty had I been successful in rearing these larvae on food plant available in this country.

During the course of our second visit to the Monchique Mountains I also found a colony of Provençal Fritillaries (*Mellicta deione* Gr.) amongst an area of dense lavender and thyme scrub vegetation. Both

male and female imagines were found to be widely distributed in this region, and many had clearly been on the wing for many days in view of their worn condition. I was surprised to note the variable size and colouration patterns apparent with many imagines. The flight pattern tended to be erratic and fast, although this butterfly frequently came to rest on the flowering heads of lavender and other plants thereby affording me with some opportunity to catch a few specimens.

Earlier that day when my wife and I stopped at the same picnic area on the Silves road where I had earlier found the Spanish Festoon, I sighted half a dozen fine Spanish Fritillary imagines, two of which appeared to be females by reason of their larger wing span. I suspect that more specimens of this species would have been found if I had extended my walking distance around this area.

No members of the Satyridae family were recorded, and I suspect that such butterflies would not have appeared on the wing for at least another month. Also I did not see any members of the Lycaenidae family with the exception of the good fortune to find one worn male Chapman's Green Hair Streak (*Callophrys avis* Chapman) fluttering around a small eucalyptus sapling at the edge of an extensive plantation bordering an artificial reservoir (Barragem da Bravura) near Lagos. Although I did spend some time searching around shrubs and young eucalyptus plants in this particular area I did not find any further specimens of this local species of Hair Streak, I suspect that this is a species that appears on the wing at an even earlier period in the year than at the time of my visit, which would account for the one isolated specimen found.

Apart from the Cleopatra Brimstone recorded, the only other member of the Pieridae family seen throughout all visited regions of the Algarve was the Portugese Dappled White (*Euchloe tagis* Hbn.). This lively butterfly appeared to be fairly widespread within areas of rough pasture and the lower southern slopes of the Monchique Mountains. The undersides of the hindwings were conspicuously pale green with pale white blotches. I noted with particular interest that this species appeared on the wing early in the morning hours and disappeared soon after mid-day and was attracted to flowers in bloom in many villa gardens. Even when sunshine was not present, this ubiquitous butterfly was seen happily flying in search of nectar.

As will be appreciated by members with young children on holiday, my observations were inevitably general in character and there was little time available for further detailed study. However, I do consider given greater opportunities this charming and unspoilt region of Europe with glorious beaches of golden sand is well worth a sustained study. The climate is most favourable in the early Spring months being generally very sunny and warm despite frequent strong westerly breezes.

Incidentally it is perhaps worth mentioning that most flight activity was confined to the hours of 10 a.m., and 2 p.m., and thereafter even the insect population in general decide that an early retirement to rest is required.

N. F. Gossling (5169)

A BALSA WOOD MODEL OF DROSOPHILA

The sight of the excellent insect models in the Natural History Museum cannot fail to impress the average entomologist, but for me they bred a possessive admiration. I wanted to own a near perfect model of an insect similar to those in the Museum, and there was only one way to achieve this ambition—I must construct an original insect model for myself. I chose *Drosophila melanogaster*. Mg. for my subject. As a result of its use in genetics, this is one of the most intensively studied of all insects, and there are vast numbers of drawings in minute detail of just about every hair and cell of this insect's body. Armed with a couple of books containing detailed pictures, and a specimen of the fly, I set out with the intention of making a scale model of the insect.

To construct a model as close to the actual appearance of the insect as possible I had to pay special attention to the finest details. This means a fussiness which is not normally associated with a model that demonstrates a particular aspect of the insect's life where the appearance of the subject itself is not critical. To appreciate the work involved in modelling the insect it is necessary to describe it briefly, drawing attention to the critical details to be included on the model.

Drosophila are small yellowish or brownish flies measuring an eighth of an inch long of rather bulbous appearance with bright red eyes. They are relatively hairless, compared to other species of Diptera, but the large hairs of the thorax occupy quite definitely fixed positions. The abdomen has yellow tergites with a dark brown or black band along the posterior margins. The wings have a fairly simple venation: there are two costal breaks and the second basal cell is usually merged with the discal cell, but an anal cell is present. The arrangement of the veins in the wings, particularly the position of each vein at the wing margin, is vitally important to identification. Additionally, *Drosophila* may be recognised by the characteristic fork at the tip of the arista (the feathery organ branching from the antennae) formed by the main stem and last hair. On *D. melanogaster* the width of the cheeks, measured from the lowest point of the eye to the margin of the cheek, is about one sixth of the greatest diameter of the eye. The maxillary palps, projecting from the proboscis, most often possess three stouter bristles on their outer end.

Using the above description as a background the way is prepared to make an examination of the stages involved in the method of construction, and the problems unique to modelling the insect.

Before starting on the model I made some accurate drawings of the body structures from photomicrographs of a specimen of *Drosophila*. The drawings included a plan and elevations from which I prepared a cardboard template to a scale of x6 life size. The head, thorax, and abdomen were carved from blocks of balsa wood to the shapes dictated by the template. The wings were cut to shape, according to the plan,

from a sheet of thin transparent styrene. I glued the parts of the body together including a short neck of balsa between the head and thorax. I scored grooves into the sides of the thorax to represent the clefts separating the various thoracic sclerites (chitinal plates on the thorax). The model continued with the construction of the legs, halteres (balancers), antennae, and mouthparts. Most of the time consumed in making the model (a total of 126 hours in all) was taken up with placing the bristles and hairs into the head, body, and legs. Demerec (1950) proved extremely useful at this time because it contains illustrations of the arrangement of the bristles as well as the appearance of various parts of the fly's body. The arista were made, and the wings completed by scoring and painting the veins. A rectangle of balsa was cut and painted as the base on to which the painted model was glued. The assemblage was reinforced with a short length of piano wire through the underside of the thorax and the centre of the base.

The items which seemed to present the greatest problems during the construction of the model were the long thin legs, the membranous wings, the arista, and emplacement of the many bristles.

At first, modelling the thin legs of the insect appeared to be the major problem. The smaller the model, the greater was the problem of making sturdy legs and being able to insert bristles into them. The four-inch length of the *Drosophila* model is probably as small as one can go before losing the ability to model the bristles rather than paint them on to the legs. The problem is retention of the bristles in the surface of the legs. I overcame this obstacle by glueing individual balsa strips, carved to the shapes of the leg muscles, around paper clips. The paper clips were previously bent to the configurations of the legs. Bristles were inserted into the surface of the balsa covering the wire legs.

The second apparently major problem is modelling the wings. This can be largely overcome by using some thin transparent plastic, such as styrene. The material was cut to shape, including small cuts around the edge to represent the hairs along the wing margins. The veins were scored on to the surface and the resulting ridges on the reverse side were painted.

However, the greatest problem was the emplacement of the bristles on to the model. I used five amp fuse wire for most of the bristles. A small dent had to be made in the surface of the model with a needle before I could push the fuse wire into it, otherwise the wire bent when pressure was applied. Later, I replaced some of the larger wire bristles with entomological pins, and because the tapering tips of the pins more closely resembled the ends of the insect's bristles, the result was a more realistic model. If different sized headless pins are used, the best effect is obtained. For example, I used pins of a diameter of 0.0124 inch for the main thoracic bristles, 0.010 inch diameter pins for the bristles on the head, and 0.0089 inch diameter pins for the smaller sternopleural bristles (i.e. on thoracic plate directly above the position of the middle

legs). Very fine pins (0.0056 inch diameter) can be used in place of fuse wire for the hairs on the legs and abdomen. The pins were 10 mm to 15 mm in length and are available from Watkins & Doncaster.

Another problem is the difficulty in handling the model as more detail is added. This is due to the nature of the model with bristles and legs protruding from the body at various angles preventing the fingers from making a secure grip whilst further bristles are added. Several times the model dropped from my hands on to the work bench, occasionally with damaging results.

The construction of the antennae can be difficult. With *Drosophila* the antennae are bulbous, but the arista are much finer, compared with the bristles on the head, and it would be impossible to construct the branches of the arista from fuse wire. Their resemblance to a feather provided me with an answer. I used the tail feather of our budgerigar (which had previously moulted from the bird, incidentally) by cutting away the unwanted vanes until only those required to display the shape of the organ remained. A small hole was made in the antenna with a needle and the completed arista inserted and glued into place.

I cannot say that the model portrays a specific species of *Drosophila*, but I had set out with the intention of making *D. melanogaster*. However, the model could, at present, represent either *D. melanogaster* or *D. simulans* Sturtevant, because the excessively small scale presents difficulty in modelling the details that speciate the insect, and it is difficult to reconstruct the form and colour of the insect precisely. A comparison of the model to a simple key of *Drosophila* (e.g. Shorrocks, 1972) reveals some shortcomings which support these conclusions:

(a) The width of the cheeks should be about one sixth of the greatest diameter of the eye on *D. melanogaster*; on the model it is less which is characteristic of *D. simulans*.

(b) The maxillary palps of *D. melanogaster* possess three stouter bristles on their outer end, and *D. simulans* has two stouter bristles. The model has none at present.

(c) The colour of the abdomen, more specifically, the white of the underside, is too bright and perfect, and resembles a pigment, which in the live insect, it is not.

Although I set out with the intention of making a perfect model of *Drosophila*, I fell short and there is some work remaining that can improve its appearance and accuracy further. However, it was still a fascinating exercise and the finished item achieved my ambition to own an insect model.

K. W. Mardle (4668)

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ATTEMPTED REARING OF THE FOX MOTH *MACROTHYLACIA RUBI* LINN.

For some time I have considered writing an account of my attempt some three years ago to rear the Fox moth. Mr. Philip Jenner's article last November has prompted me to do so. Unlike him however my results were disastrous.

On June 14 1971 whilst in the New Forest, Hants., I noticed a male *rubi* careering wildly about a woodland ride apparently concerned with a particular spot. With net in hand I resisted the temptation of netting the moth as I realised a female could be the reason for his interest in this area. After several minutes his activity gradually subdued and he revealed the female to me hidden amongst the grass, probably just emerged, although her cocoon eluded me. They paired immediately, and I left them to it.

The time was about half past four in the afternoon, and not until nearly six o'clock did they part. The male I kept, and putting the female in a large pill box, I headed towards Lyndhurst.

After almost an hours walking I chanced to look at my prize, which had, to say the least become very active in her confined quarters. In a frantic spell of activity she had filled up the pill box with eggs, some glued to the sides of the box, others loose. I had achieved a personal ambition; to have sufficient numbers of eggs of this moth to give one a chance of successfully bringing a few larvae through the forthcoming winter.

So, forearmed with information from previous Bulletins on how to rear this larva, I felt assured of some success. The larvae commenced hatching three weeks later. At first I kept them indoors and fed them on garden climbing rose, which they ate readily. As soon as they reached about an inch and a half in length, I transferred them onto broad-leaf Sallow which keeps well in the autumn, and put them outdoors in 18 inch diameter galvanised cylinder cages at the bottom of the garden.

I kept the foodplant in jars of water sunk into several inches of soft soil, and on top of this placed a three inch layer of moss. The cages were covered with old net bags, and over the top I kept a roof cover during wet periods of weather. Every few days I changed the sallow, and on sunny days removed the plants to avoid wilting. By the middle of September all the larvae were in their last instar, but mortality had started to set in, and each evening whilst putting in fresh sprigs I sorted out the dead larvae; these were limp and flaccid, none were mouldy or showed signs of any fungus which is renowned for attacking this species. The larvae fed only at night, and by day remained curled up in a small depression made in the soil or amongst the moss. At night they would climb the sallow stems and seemed to thrive, however by October only a handful remained alive.

My last memories of that fateful autumn were of me trudging wearily to my local wood to cut what sallow was left, on, would you believe it, Guy Fawkes night, to supply food for about ten living larvae. These too eventually perished by the middle of November.

It is not easy to write about one's failures, but after all this is the real test; to describe successful breeding achievements is easy; I cannot offer any answers for my failure, I kept my cages as clean as was possible, and spent a great deal of time on them, perhaps I just had too much of a good thing. In future I'll stick to searching for the larvae in the spring after hibernation!

J. Platts (4300)

NOTES ON BRAZILIAN MOTHS

Urania leilus, L.

I once came upon quantities of these beautiful day-flying moths, in June 1951, at Aqua Vermelho in Alagoas. They were fluttering about amongst the sun-dappled foliage, some 25 feet above the ground in a shady wooded dell, very leafy and dripping from a light shower earlier that day. (The time was the late forenoon. The locality is about 1300 feet above sea level).

A few of these moths, very bedraggled and exhausted, were struggling in the slow-moving stream which had developed, and amongst them floated a few sodden and dead specimens. I did not succeed on this occasion, in getting a single good specimen, as most of them hovered at too great a height to catch.

Some years later, during a fortnight in June 1957 at Garanhuns, Pernambuco, large numbers of *U. leilus* were seen at rest on the young leaves of "pitomba" trees growing in a copse of eucalyptus trees at an altitude of 2,800 feet. On being disturbed they would fly off rapidly and settle on other "pitomba" trees and tufts of grass. They were most active in the late forenoon, when they fluttered about between the tops of the "pitombas" amid the foliage of the eucalyptus trees, which were much taller. Their flight at these times consisted of "flickering" movements. When disturbed their rapid flight was in the form of darts and sudden swerves, 15 to 20 feet high at first, but soon descending to lower levels.

The weather during the whole of this period was dry, apart from a few showers at night, this being the end of the rainy season. The mornings were misty.

Of the score or so specimens captured, nearly all were released, as their hind-wings were rather ragged, only four being in good condition.

Towards the end of May 1966, in the territory of Amapá, I witnessed these lovely moths in hundreds, in rapid flight, at Santana (altitude about 50 ft.). They were flying 5 to 20 feet above ground level and were heading in a South-Easterly direction. The terrain here is of the open savannah type, with few trees. The time was early afternoon and the weather was dry though it had rained heavily the day before.

Many of these moths were resting, apparently exhausted, on tufts of grass and low-growing weeds, their gorgeous colours glistening in the

sunshine. Some could be picked up by hand, and as I had no net, a couple of these were the only specimens I was able to collect.

On reaching the bank of the Amazon, the approaches to which were here covered only by grass and tangled brush, they dipped almost to river level and continued their flight at 2 or 3 feet over the water, some just skimming it. Before reaching the island of Marajo, or some of the smaller islands, numbers, I judged must have perished in the river. This flight seemed to cease fairly suddenly, between 5 and 6 p.m.

In the forested Serra do Navio, in the interior of the same territory, too, at an altitude of about 700 feet, 200 kilometers from Santana, I saw many *U. leilus* in the open manganese-mining areas on the fringes of the forests. Like the large numbers I saw at Santana, these also were flying South-Eastwards, and in this case too there had been heavy rain on the previous day. Here also I picked up a few tired specimens, but released them on account of their tattered condition.

The same year (in July 1966) while travelling on a river steamer near Itacoatiara, on the Amazon, I captured two *U. leilus* which were flying about below the deck awnings. The North bank of the river (whence, I suppose they came) was some 50 feet distant at this time. One of these specimens, unfortunately had a tail missing, and was therefore released.

Apart from the occasions I have referred to, I have come across solitary specimens of *U. leilus* at various times in Pernambuco and Para, but only rarely have captured one in perfect condition.

Pseudosphinx tetrio, L

This powerfully proportioned sesiinae sphinx, with its $4\frac{3}{4}$ -inch wing spread and streamlined body, is common after the rainy season, from North-East to South-East Brazil. As may be deduced from its shape and robust build, *P. tetrio* is a strong and rapid flier. It is the commonest of several genera often found asleep on lamp posts, during the day, in many of the better illuminated cities, its cryptic colours blending excellently with the grey concrete of its resting place. Its wings are intricately marked, with grey as the general colour of its forewing, transversally cut by irregular whitish and rusty brown streaks and blotches; the hind wings are brown-black, fading to light brown towards the inner margins. The long, tapered, grey-brown abdomen has four or five rusty-black bands, which, however, do not quite encircle it, stopping at its off-white underside.

I have frequently found its handsome caterpillar in gardens and in the "mats", principally, in my experience in very humid areas. This caterpillar is very striking in appearance, velvet-black with black-peppered scarlet legs, head, tail-base tubercles and anal segment. There are ten or a dozen yellow or yellow-green bands along its $5\frac{1}{2}$ -inch length, from near the dorsal line to its underside; and it has a very thin black tail which twitches constantly.

In company with a dozen or so of its kind this caterpillar feeds voraciously on the ornamental Jasmin-manga (*Plumeria rubra*, L., and *Plumeria alba*), in the gardens and on related wild plants in the jungles. In most cases, before the caterpillars pupate, their food plants are rendered practically leafless. The $2\frac{3}{4}$ inch pupae are enclosed in rough "thread"-bare cocoons.

Terence C. Hanson (5242)

NOTES ON REARING THE OLEANDER HAWK, *DAPHNIS NERII* L.

The following notes are based on experience with 15 Larvae and one ovum found in the Episkopi and Limassol area of Cyprus in Autumn 1973.

The eggs are laid singly on white or pink oleander *Nerium oleander*, on the underside of fresh leaves close to the growing point. Only one egg is deposited on any branch. The egg is pale green and similar in size and appearance to *Loathoë populi* L.

The young larvae are pale green with a disproportionately long straight black horn. The "eye" marking and the stripe are scarcely visible. After the first moult however, both these markings are clearly discernible. Also, there is a change in the horn. It is black and relatively thick for the first half of its length, at which point it abruptly turns yellow and tapers away to nothing. At the next moult only the lower portion remains, and this no longer straight, but downturned and rough-textured. The "eye" marking is now blue. The young larvae move straight in to the fresh young leaves at the growing point where they attack the underside cuticle with a single bite technique. The oleander produces a lot of sap and this results in a lot of tiny brown spots on the young leaves—making the larvae easy to find, even on a large bush. As they grow plump the green takes on an attractive blueish-grey hue and they are more difficult to find despite their voracious appetites. Some reached 90 mms. South's descriptions and illustrations (in "Moths of the British Isles" and "The Caterpillars of British Moths") are rather misleading as they depict a fully grown larva which has already started the colour change prior to pupation. At this point a large black patch appears on the first segment, just behind the head, the blue "eye" turns black. The overall colour changes through dirty green to grubby orange. In captivity they formed loose cocoons from old newspapers in preference to burrowing.

The pupa is large and has black markings on a rich yellow ground colour. They are continuously brooded in Cyprus and hatched only 16-22 days after pupation, having first darkened almost to black.

The males are vigorous in captivity, and damaged themselves systematically. They did not feed and died the day after the first female hatched.

Rob Parker (5247)

CIRRHIA OCELLARIS COMMON OR RARE?

In September 1972 I was fortunate to obtain at sugar several specimens of the Pale-lemon Sallow, (*Cirrhia ocellaris* Borkh.). South in his moths of the British Isles gives the impression that the species is scarce except in Suffolk. It is not by any means common in the North Kent locality where I found it, and the levelling of a row of black poplar trees has certainly not helped, although I obtained about seven at sugar again this year.

In last November's bulletin Mr. W. Coster mentioned two specimens in his light trap recordings in East London, and the moth may be more frequent than one is led to believe, at any rate it may be established wherever black poplar is well represented. South also mentions Wych Elm as an alternative foodplant. I would be interested to know if any members living in North Kent know of this moth in their district

J. Platts (4300)

BOOK REVIEW

A Survey of the Macro-Lepidoptera of Croydon and North East Surrey. by L. K. and K. G. W. Evans. Published by the Croydon Nat. Hist. and Scientific Society Ltd. pp. 134 and 1 map. Price £1.00.

The area surveyed in this booklet is probably more rich in Lepidopterists than any other area in Great Britain and 68 persons receive acknowledgements for the recordings. The species recorded in this area of some 230 sq. miles in north central Surrey are listed using the format similarly used in J. M. Chalmers Hunt's *Butterflies and Moths of Kent*. The records for each species commence in 1950 and are supplemented by comments as to status, etc. Many areas cited are no longer capable of sustaining the species named and are of historic interest only. Ashted Woods are a case in point where many of the species have now vanished. The nomenclature in many cases goes awry but with so many recent changes this is not surprising. The book should prove a useful basis for new observers to work from.

P. W. Cribb (2270)

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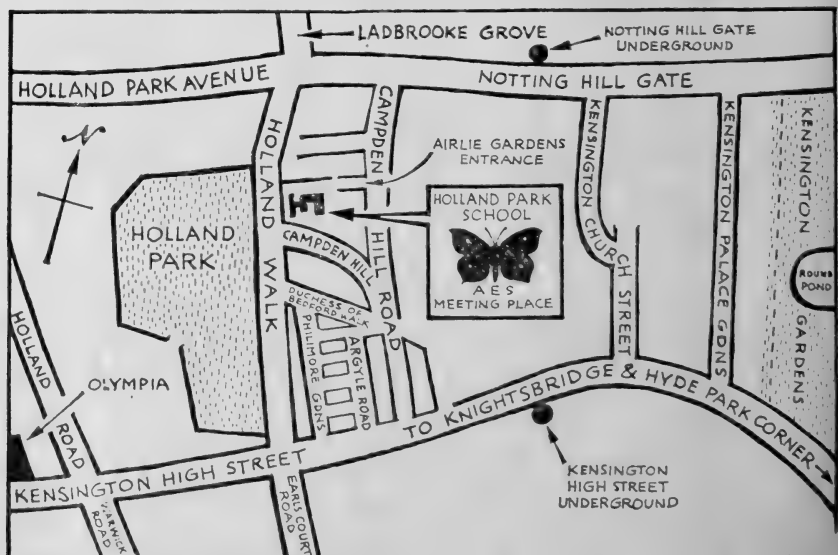
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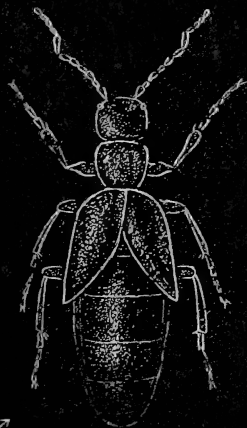
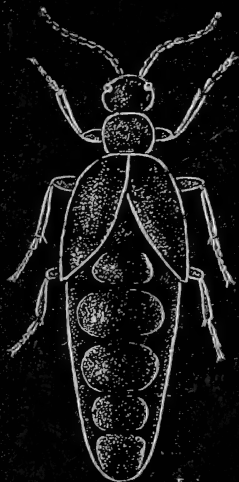
NOVEMBER 1974



**THE BULLETIN
OF
THE AMATEUR
ENTOMOLOGISTS'
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World List abbreviation :
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Edited by : BRIAN GARDINER, F.R.E.S.



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They are:

1. Use as large a piece of paper as possible. Decimal A4 or old-fashioned Quarto or Foolscap are the most convenient.
2. Use only one side of the paper.
3. Leave wide (not less than 1 inch please) margins to both left and right of the writing.
4. The style of the Bulletin is to include the scientific name of an insect and the author who named it. Include these wherever possible, but if not known leave enough space for your Editor to fill in.
5. Always use double (or even treble) spacing when typing, and wide gaps between lines when writing by hand. This not only leaves ample space for editorial changes, when required, but also greatly facilitates the typesetting when the manuscript finally reaches our printer and so helps to both avoid mistakes and speed the production which in turn helps to hold down ever increasing printing costs.

Thank you one and all.

Brian O. C. Gardiner

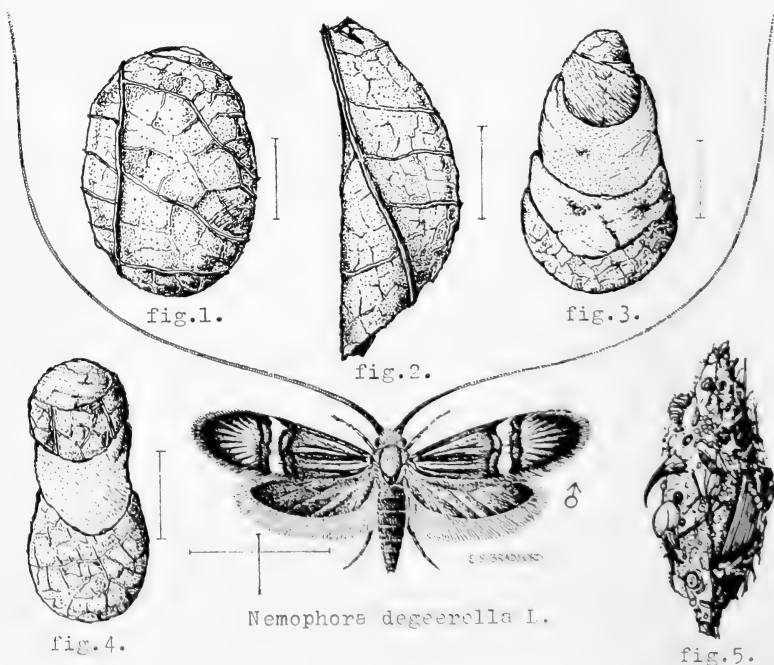
COLLECTING NOTES—THE SMALLER MOTHS

My desire to find larval cases of the Adelinae and other genera was aroused one day in early April in a wood in East Blean, Kent, by two incidents. One was the finding of a larval case of *Diplodoma herminata* Geoff. at the base of a tree, the other when I discovered a case of what was possibly *Incurvaria masculinella* D. & S. within the remains of an old birds nest, in the stump of a dead oak. I got to reflecting that the larvae of some of these very common moths live in portable cases on the ground, and wondered whether I might find some if I looked among the leaf litter and plants growing in the wood. One sees the moths in most collections of micros; nearly always they were taken

as imagines on the wing, hardly ever does one see the larval cases from which they emerge.

I began my search near some trees where the ground was open and not too densely covered with undergrowth. Very soon I discovered that one has to get on ones hands and knees for this task, and I was fortunate in having some large polythene bags on which to kneel and keep my knees dry. A cushion would have been a great comfort. After a while I found a larval case which I recognised as one of the *Incurvaria*. Another case was found before I came across one that was unfamiliar to me. Two hours later, after searching several areas I had seven cases. I moved to another spot, found one more case and then decided, as time was getting late, to fill a couple of bags with leaf litter, tufts of grass and other refuse, take them home and sort through the material in comfort.

At home I procured a large photographic developing dish, in which to sort through the leaf litter, plus some glass tubes and jars in which to put anything of interest. I spent some hours during two evenings going through the material and eventually possessed about thirty larval cases of various species. I wondered whether any moths would emerge and whether the time had been worth it. There seems to be no easy way, as far as I can see at the moment, of finding the larvae of these moths, other than by diligent searching, either on ones hands and knees in the



woods, or in taking the leaf litter home and sorting through it at ones leisure. Some of the larval cases are quite difficult to see, they so resemble bits of dead leaf and I must have passed several over while searching the material.

The results showed at least five species. Several cases (fig. 1) were oval in shape and rather flat. Three specimens of *Incurvaria masculella* emerged from these. Four cases, made from a single piece of leaf folded over, and all much alike (fig. 2) failed to produce moths, although one was seen to move at one time. They were the larval cases of either *Tubuliferola flavifrontella* D. & S., or *Tubuliferola suborchreella* Doubl. The moths are known to occur in the wood, as imagines of both species have been taken there. Some cases were egg or pear shaped and somewhat flat (fig. 3). These were made of several pieces of leaf, some of more contrasting pieces, which made them easier to see. No moths emerged, so I thought they were old cases, until they were taken from the container to illustrate for this article. From the corner of my eye I suddenly saw a case flick over, and then noticed a larva protruding from one end and wave about. I quickly put it back into the container and carried on drawing from a second case. I got another surprise after a while when I saw this case also move. It got very interesting when a further case moved, making three in all. Apparently the warmth of my desk lamp was a bit too much for the quiescent larvae and they wished to escape the discomfort. Had I not taken the cases to illustrate I would not have discovered that this species, whatever it is! may live at least two years in the larval state. The cases are the same size as when I first found them in early April and no moths have emerged up to the 30th July. I might now have to wait until next year to discover the species whose larvae construct this type of case. The remaining cases (fig. 4), apart from one, eventually produced a number of imagines of *Adela reamurella* L. and *Nemophora degeerella* L. The cases of these two species appear to be so much alike that it is difficult to tell them apart. They are fatter cases and have a bulge at both ends, are constricted, or have a waist in the middle and look something like a dumb-bell. The most interesting thing about these two species is in the way the very long antennae are contained within the pupa. I extracted two pupal skins, one male and one female from the larval cases of *Adela reamurella* and a male from a larval case of *Nemophora degeerella*. In the female the shorter antennae extend almost to the base of the pupa and are then looped round the body once. I cannot tell at the moment, whether the same applies to the much longer antennae of the male. They may have moved in extracting them from the cases. In both species the antennae of the male reach almost to the base of the pupae and are coiled round a number of times like a watch spring, but whether they are looped round the body or coiled on the ventral side I am not sure. The last case (fig. 5) was made by the Psychid mentioned at the

beginning of this article, namely *Diplodoma herminata*. This was found in leaf litter away from trees. The larva spins an inner triangular case of silk and a thinner-stranded outer case, onto which it sticks all manner of refuse including odd seeds, grains of sand, bits of plant material, beetle elytra etc. A moth emerged from this case in due course.

I found it best to sort the larval cases, as far as possible into separate species and keep them in different containers with tufts of grass and other plants, moss and lichen, as well as leaf litter, so they had a variety of food material. On the whole it did prove a very interesting experience searching for the larvae of these species and plans are to search different habitats next year.

A host of other inhabitants of the leaf litter came to light during the search including beetles, mites, spiders, centipedes, woodlice, parasites and lepidopterous larvae etc. Two Geometrid larvae seemed to feed up almost entirely on decayed leaves and bits of grass, later emerging as *Idaea aversata* L. and a number of dirty looking grey-brown larvae produced *Endotricha flammealis* D. & S.

E. S. Bradford (3068)

A MOUNTAIN FORAY

Over the last few years I have been fortunate enough to visit many of the mountain areas of Europe, but in 1974 it was not possible to arrange such a trip and I thought it was time to have a look at some of our own mountains. On the 22nd June I drove north with camping kit stacked in the back of my Cortina Estate, stopping first near Liverpool to visit my son who is a teacher there. We spent the 23rd visiting the large area of sand dunes near Formby where there is a reserve for the Red Squirrel. Botanically the area is of considerable interest and although the only butterfly seen was the Small Heath, *Coenonympha pamphilus* L., the diversity of plant life would indicate that it would be a very interesting area to work for moths and other insects associated with coastal dunes. I then drove north via the new Motorways to Kendal and pitched tent at the National Trust camp site below the Langdale Pikes. The day was hot and still as I started the climb up the rough path through the Dungeon Ghyll towards Stickle Tarn just below the Pikes. The way was decorated with clumps of bright Foxgloves and some errant *Rhodendron ponticum*. I saw a few Small Heaths and then what I had hoped to find, a wildly flying Mountain Ringlet, *Erebia epiphron* Knoch. However after a somewhat exhausting climb I reached the grassy slopes around the Tarn but could find no more *epiphron*. A lone fisherman was fishing the tarn which is surrounded by damp boggy areas which I felt sure should have been the home of the butterfly.

It is in areas just like this that I had taken it on the top of the Simplon Pass. I then met two young ladies who were taking a census of

visitors to ensure whether they were equipped for and knew the dangers of walking the fells. As I had compass, map, raincoat, warm jersey and food I think I passed their test. After covering quite an area around the tarn I decided that perhaps I was not high enough yet and climbed up a big south-facing slope beyond Harrison Stickle, the highest of the Pikes. Here I was suddenly rewarded with an amazing sight—by a rough scree strewn path there was a patch of Thyme, *Thymus Sp.*, and upon it were feeding eight *E. epiphron*. There were both sexes present and I noticed that many of the males had already passed their best. The height here was about 2,000 feet which bore out Keith Porter's remarks (see Bull. amat. Ent. Soc. Vol. 33;303.) that the butterfly lives at this altitude in the Lake District. This slope was alive with the butterfly which were visiting the Thyme and *Potentilla tormentilla* Neck. growing amongst the clumps of Mat Grass, *Nardus stricta* L. The only other flower present was a dwarf Bedstraw, *Galium saxatile* L. which was occasionally visited also. The slope was in the full sunlight and the butterfly occurred all the way up to the top of the knoll which levelled out and was covered with more of the damp bogs found lower down. I still found them on the wing here but not so abundant as on the flowery slopes. I was able to photograph both sexes and take samples of the males for examination and two females for egg laying. I cut out a small clump of the *Nardus* to take down with me for the latter purpose. I spent the best part of the day on this slope and around it. The breeding area of this colony is fairly restricted but the wind would make drifting to other suitable sites fairly frequent and on lower and adjoining slopes I did find wandering males, all either racing with the breeze or fighting against it, usually up hill. Most of the females were fresh but I did not observe egg laying, all the insects being intent on feeding. The view from here is wonderful with Blean Tarn in the distance and farther away the glimpse of Windermere. There was hardly a cloud in the sky and I could not have chosen a better day for the climb. As I ate my sandwiches a helicopter from R.A.F. Rescue suddenly appeared above me and landed just below me on a grassy hillock and, as I watched, a group came down off the Stickle with a stretcher which was loaded into the helicopter which then took off and flew away south. I learned later that a rock climber had fallen and injured his head, an indication of the possible hazards that a slip can cause in these mountains.

It was quite noticeable that about 4 p.m. flying activity of *epiphron* virtually ceased despite the sun still being quite hot. They were still feeding or resting on the Thyme patches and would fly up if disturbed. I made my way down by a roughly marked path about 5 p.m. and noticed one or two Wood Tigers, *Parasemia plantaginis* L. whizzing about, and later in the rough meadows above the camp site I nearly captured the white male form, *hospita* Schiff. There were Curlew with young in these meadows and they filled the air with their haunting cries

and liquid trilling. This is a pleasant spot and there is a small shop on the site for milk and groceries, run by the Trust.

The next morning I had arranged to meet Keith Porter at Grasmere village and the morning was again hot. I had a look at Wordsworth's grave and watched some large trout taking nymphs in the river running beside the churchyard and collected Keith from his bus just after mid-day. We drove off through Keswick into Borrowdale to the head of Derwent Water to Seathwaite. We parked the car at the farm and took the path which climbs up the valley towards Seathwaite Fell and Sprinkling Tarn, an area previously collected in by Keith. The climb is not steep but quite lengthy as we crossed and recrossed the stream, in which we spotted the occasional trout. I netted a fresh male Small Pearl-Bordered Fritillary, *Clossiana selene* L., by the stream on our way up. The plants growing by these streams are of considerable botanical interest but apart from one or two Dragonflies we saw little of entomological interest. Near the top of the climb we took one or two Click Beetles, (Elateridae) and then came out onto the flattish area around the tarn. Immediately we observed *epiphron* by the tarn and then flying amongst the grassy knolls and around the boggy hollows to the south of the tarn. We worked down the slopes and found the dispersal of the butterfly to be much wider than Keith had found it in the previous year. There were a lot of Small Heath flying with them and the occasional Wood Tiger. Of the latter I took two females which kindly laid eggs in the pill boxes later in the week. As we made our way down the southern slope of the fell towards Sty Head Tarn the numbers of *epiphron* diminished and long before we reached the tarn they had gone. This again indicates that the altitude of occurrence is very restricted. We found the tarn to be full of Minnows in the shallows with a few Black-headed Gull fishing over the water.

The day was coming to an end as we reached the farm, where we had a bottle of lemonade apiece. This farm had been flooded some years before when a huge cloud burst on the fells above had turned the valley into a raging torrent and a large stone wall now stands between the stream and the farm to give it some protection. We drove back along the road to Seatoller Farm where there is a fine camping field beside the stream. We cooked our supper and spent the evening unsuccessfully trying to worm some of the trout out of the stream but it was too low and clear. This is a beautiful spot to camp and in the morning we had milk from the farm with our breakfast. We woke to lowering skies and heavy cloud on the mountain with the forecast promising little improvement. We therefore decided we would drive north and have a look at the Scottish race of *epiphron* while the Cumbrian race was still fresh in our minds.

South of Penrith we made a detour to examine a moss which Keith

had found where *Coenonympha tullia* Müll. flew and despite the weather we hoped to be able to see some. As it was, the moss was swept by a cold wind and there was nothing flying but a few Chimney Sweepers, *Odezia atrata* L. We walked across the area and Keith found a male *tullia* resting on a clump of Heather and a little way off I found another sitting on the head of a Spotted Orchis. There were also a lot of Bog Bean, *Menyanthes trifoliata* L. in flower and Keith found a Curlew's egg recently hatched. We also found two larvae of the Emperor moth, *Saturnia pavonia*, L. on a clump of the heather. A drizzle met us as we crossed into Scotland, again back on the motorway, but as we passed the new town of Cumbernauld we could see the sun on the distant mountains. We were heading for the mountains of Perthshire north of Loch Tay and arrived there early in the afternoon. The sun was still shining as we climbed the slopes of the mountain, having parked the car near a small hydro-electric water storage reservoir. Here the herbage seemed much longer than that in the Lake District but was of similar content including the patches of Thyme and Potentilla. *E. epiphron* was immediately plentiful moving over the rough grasses from flower patch to patch, the altitude being not much above the 1,400ft. mark. Working up the slopes we found it up to 1,800ft. on the south facing slopes. The condition was about the same as at Langdale with both worn males and freshly emerged ones.

There are a lot of boggy hollows on the slopes and in these I disturbed several resting females. However the butterfly appeared to be well distributed over the whole of the south-facing slopes and plentiful, as I saw up to five on the wing together on occasions. The alpine flowers here are of considerable interest and I found a species familiar to me in the Alps, *Polygonum viviparum* L., which propagates itself by means of small bulbils. Later that day we visited the Scottish Naturalist's Trust establishment below Ben Lawers where the geology and flora and fauna of the area is displayed very effectively in an excellent little museum. The flowers of the area are shown on a continuous slide show and there is a fine painting by A. D. Russwurm of the various forms of *E. epiphron* found in the surrounding district. We had an interesting discussion with the warden before driving back into the mountains to find a camping site for the night. We pitched camp beside the reservoir and cooked a meal. I tried to lure a large trout out of the stream nearby by means of a worm but he ran me under a rock and I lost him. There were sandpipers and Black-headed gulls on the lake side and we heard grouse and ravens on the slopes above. It turned very cold and temperatures must have dropped near to freezing during the night—we were about 1,200ft. up. We had a rough awakening in the morning with a sheep dog bouncing against the back of the tent as the shepherd rounded up a few sheep into a truck. It was a clouded morning early but after breakfast it promised to

clear so we waited and then climbed up the slopes above the lake and as soon as the sun came out the grass became dotted with fluttering *epiphron*. About fifty yards up the slope on a dry area thick with Moor Grass and patches of thyme I found a freshly emerged male drying its wings.

This confirmed that these dry slopes are at least part of the breeding area but whether the damp hollows, where the snow must lie very thick, are also suitable for the larvae I am not able to say. Certainly the concentration of the butterfly seems to be on the drier slopes. This follows the pattern of the butterfly as observed in Yugoslavia and both in the Lakes and here in Scotland the type of terrain for the butterfly was more like that of Montenegro on the Stozina Pass than the areas at the top of the Simplon in Switzerland. One of the females which I had taken had been placed in a plastic (ice cream) container with a clump of Mat Grass and already I found that it had laid a good number of eggs (27 June). These subsequently hatched on the 18th July. The eggs are greenish when laid and quite markedly ribbed. They seem large for the size of the butterfly. After a few days they turned to a straw colour and were quite difficult to see on the brownish grass stems. By the road below the slope we netted some specimens of the single brooded *Pieris napi* L. which occurs in these mountains and I also netted one specimen of the Common Blue, *Polyommatus icarus* Rott. There were large numbers of a small Carpet flying, *Epirrhoe tristata* L., but as the sky began again to cloud up we decided to drive back south as Keith had to be back home on the Friday. We were able to motor back all the way on two or three-lane dual carriageways from Perth to the Lakes and then again on to London.

The following observations on the two races of *E. epiphron* can be made from our findings. The terrain favoured by the butterfly is one of a southerly aspect, well grassed and having a sprinkling of Thyme and Tormentil. Dry slopes, that is those with a fairly steep slope, are most frequented but the butterfly also occurs but less frequently in the damper hollows. The altitude in the Lake District of occurrence is around the 2,000ft. contour while that in the Scottish area visited is much lower, down to about 1,200ft. Although the butterfly is a low flying insect there is some wind scatter and odd specimens were observed below the main areas in both cases. The Lake District specimens are much more uniform in pattern than those from Scotland and are on an average smaller. Those from Perthshire are very variable and included specimens of the form I referred to previously (Bull. amat. Ent. Soc. Vol. 27: 279), as form *thomsonii*, being well marked with orange but devoid of eye spots. The nearest place that the butterfly occurs to these races in Europe is the Alps and we hope to publish later some details on comparisons with the continental races.

P. W. Cribb (2270)

ACULEATA NEWS

This article is intended to be a general round up of Hymenoptera news.

The Bumble Bee Distribution Map Scheme enters its last year and so anybody who can capture or identify a Bumble or Cuckoo Bee and who has not yet joined should really do so. The Home Counties have been adequately mapped, but more help is needed from the Midlands, parts of the North and particularly Lincolnshire, a very poorly mapped area. More members too are needed for Scotland and parts of Ireland, especially the Central Plain, so anybody going there for their holidays might see what they could find. Details are available from the B.R.A., address on the back cover. By the time you read this, the provisional Atlas will probably have been published and the preliminary Atlas is already available from the B.R.A. at a modest price of 40p. Dr. D. V. Alford is publishing a book which we understand is to be entitled "*Bumblebees*". It will include a key to *Bombus* starting from scratch. This year also sees the start of an Aculeata recording scheme, details of which appeared in our last issue.

In recent months, two new books on the Vespidae have been published. The first one is *Wasps*, published by David and Charles at £3.75. A word of warning must be issued about this book, which was originally published by an American University Press. As you may imagine, this book is completely concerned with the American members of the family. The second book is also called *Wasps* and is published by Sidgwick and Jackson at £8.50. See independent review of this book on page 152. The price is of course on the high side and personally I shall wait and see if the publishers bring out a cheap paperback edition. It is also most unfortunate that these two books have the same title. Should the beginner not be certain just what to look for, I now offer him some advice. The book with probably the best introduction to the order is the recently published *A Field Guide to the Insects of Britain and Northern Europe*, a book which I cannot praise too highly. It is by Michael Chinery and published by Collins at £2.95. Other books the beginner might find useful are *Collecting, Preserving and Studying Insects*, by H. Oldroyd; *Insect Natural History*, by A. D. Imms (especially chapters 12 and 13), and more than ever *The Hymenopterists Handbook*, published by this society. Another suggestion is to visit your local Museum which will probably be able to help either by access to collections or the museum library which could well contain specialized books. The first copy of that great rarity Saunders (1896) I ever saw was in the local Museum.

My final point concerns the Hymenoptera group which hopefully will be set up in the near future. I have thought a great deal about this group so what I propose is as follows:

Firstly, the group will have a Bulletin, in which all members can publish observations, etc.

Secondly, a library of photostated and original papers, which can be circulated to members.

This will I hope, fill a great need, but will at today's prices be very expensive. If you are interested and prepared to help, please write, and if you have any suggestions, please write, if you don't—it will not happen. A group can only flourish when sufficient people show enough interest and active support.

Best wishes for the season.

Richard Hoyle (4886)

INTRODUCTION TO CRANEFLIES—PART VII

Hairy-Eyed Craneflies

A closely defined group of craneflies have hairy eyes. These belong to the tribe Pediciini of the sub-family Limoniinae. The hairs are usually sparse, but none-the-less very distinct using a hand lens; (view either against the light or view an illuminated specimen against a dark background). The larvae are mostly predatory in wet soil and mud by streams and in marshes and bogs. The adults are in greatest diversity in the north and west of Britain since acid streams and bogs are favoured habitats.

The key by Coe is not particularly easy to use so a revised one is given below:—

1. Discal cell present (eliminate in following order)
 - a. Large *Tipula* like species with bold wing markings *Pedicia rivosa*
 - b. Entirely yellow or yellowish-brown species *Crunobia*
 - c. Wing membrane hairy, wing rather broad *Ula*
 - d. Blackish or at least partly brown species without above characters See 2 c and d
2. Discal cell open (eliminate in following order).
 - a. Two cross veins between R_1 and R_2 *Dicranota*
 - b. Wings with a bar one third from wing tip and some spots *Amalopsis*
 - c. Predominantly dark grey or black species *Tricyphona*
 - d. All coxae yellow, underside of abdomen largely yellowish *Ludicia*
 - e. Light greyish brown species *Dicranota*

Genus *Pedicia*

This genus is characterised by the antennal segments having 15-17 segments. There are five sub-genera—*Pedicia*, *Crunobia*, *Amalopsis*,

Ludicia and *Tricyphona*. *Pedicia rivosa* L. is the sole British member of the sub-genus *Pedicia*. The wing markings are so distinctive that there can be no confusion with any other crane. It is a widespread species occurring locally from April to September in marshes, bogs and by streams. The larva, a large white leatherjacket with vicious looking black 'jaws' which are vigorously extended from the hidden head, is predatory in wet mud and peat.

Crunobia; there are two species which are confined to stony streams. Whilst frequent in northern and western districts, they are virtually unknown in the SE of Britain—no doubt because suitable stony streams are scarce. *C. littoralis* Mg. is a large yellowish-brown species with a long body, wing length 12-16mm and dark grey head, whilst *C. straminea* Mg. is smaller, pale yellow and has an entirely yellow head. (Note that *Lipsothrix*, an Eriopterine, without hairy eyes, to be dealt with later, can look very similar to the latter species.)

Amalopsis; the single species is *A. occulta* Mg. which is found on bogs and sometimes by upland streams, particularly in early spring and autumn. It is almost unknown in S.E. England. In addition to the bar like marking on the wing, there is a spot at the base of R_5 and another over r .

Ludicia; for separation of the two species one should note the distinct anal angle in the wing of *lucidipennis* Edwards, whereas in *claripennis* Verrall, the anal angle is much less pronounced. They are mainly found by boggy streamsides in the west and north.

Tricyphona; the discal cell is typically open, but may occasionally be closed. *T. immaculata* Mg. is one of the most common blackish crane-flies to be found by muddy streams and seepages. The wing venation (illustrated) and yellowish bases to the femora are very characteristic. The praescutum has a broad dark median stripe, but if this stripe is divided at least in part into two bands then the specimen will be one of the two local species; *schummeli* Edw. is found on acid bogs (cell R_3 , the second sub-marginal cell, is very short stalked) and *unicolor* Schum. is a scarce species of boggy or upland districts (with a longer stalk as in *immaculata*).

Genus *Dicranota*

There are only 13 segments in the antennae of this genus. There are two sub-genera, *Dicranota* and *Paradicranota*. The two cross veins between R_1 and R_2 are distinctive of the genus but there is only a single cross vein in one species of the later sub-genus. All species are confined to streams as a breeding site. This is not an easy genus for the beginner.

Dicranota; there are two species which are characterised by a darkish stigma.

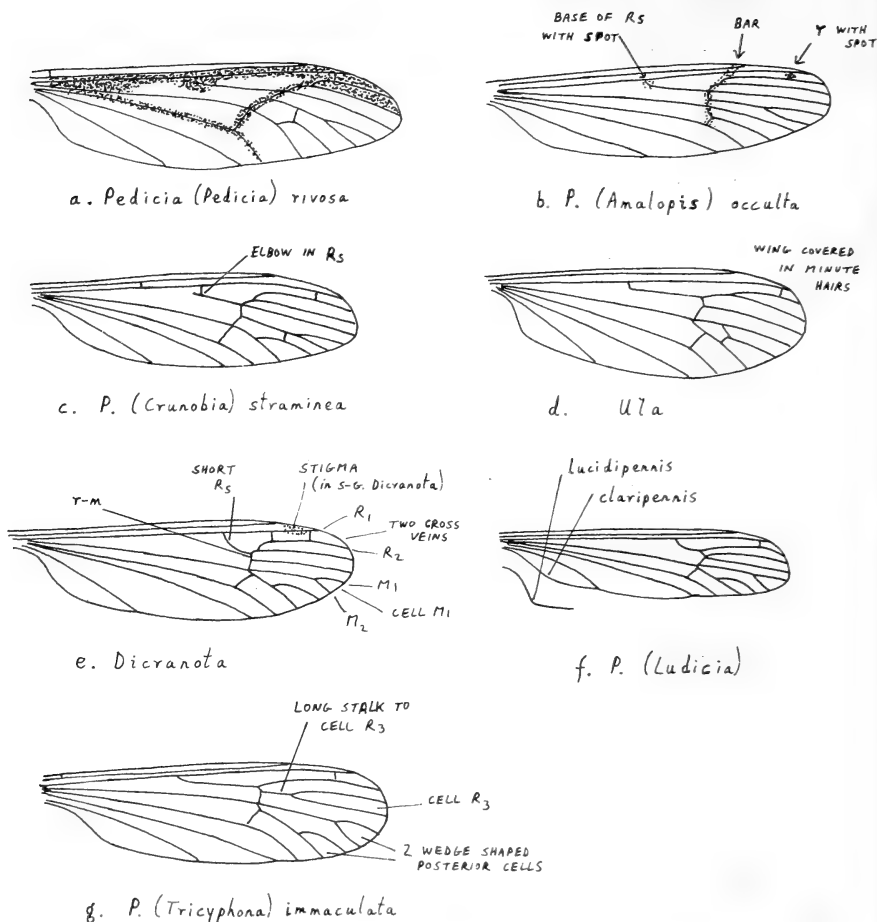


Fig. 6

Wings of Hairy-eyed Craneflies (Pediinae). These are not drawn to scale: typical wing lengths are as follows *Pedicia rivosa* (20-24mm), *Amalopsis* (11-15mm), *Crunobia* (9-16mm), *Ula* (6-10mm), *Dicranota* (5-10mm), *Ludicia* (7-12mm) and *Tricyphona* (6-9mm).

D. bimaculata Schum. is widespread by small streams but rarely common. *D. guerini* Zett. is largely an upland species, occurring even by small snow melt streamlets, and has a much darker cloud over wing vein r-m than has *bimaculata*.

Paradicranota; the six species include some rare ones. Of the five species with two cross veins between R_1 and R_2 , *D. pavidata* Hal. is both common and distinct in having cell M_1 absent.

D. robusta Lund. is a dumpy western species, pale brown and with 10 or 11 antennal segments instead of 12 and is rare. Of the remaining three, *D. subtilis* Lw. has reddish yellow tinged coxae and is the second most frequent species whilst *D. simulans* Lack. and *D. gracilipes* Wahl. have grey coxae and are rare species of high upland streams. The sixth species *D. exclusa* Walk, is atypical in having only vein *r* present; it is fairly widespread in Wales and Scotland in the spring and has been found commonly in Wales in the autumn.

Genus *Ula*

The broad hairy wing membrane, with discal cell present, and hairy eyes makes these crane-flies quite distinct. They are also exceptional among the Pediciines in their larval habits, since they live in fungi. The two species are not easily separated, but both occur widely in woodlands.

(to be continued)

Alan E. Stubbs

ON VANISHING BUTTERFLIES

For the past century and a half, when reliable records have been kept, there has been a continuous decrease in the number of our butterflies. Today less than half of the total number of species are on a safe footing and even these are not as abundant as they were at the turn of the century.

Europe is poor in butterflies and more species may be found in a few square miles of the Amazon valley than exist in the vast area extending from Ireland to the Urals; from the arctic circle to Sicily. Of the 15,000 recorded world species less than 1,000 are European and only 69 British and even of this small total about 20 per cent rely for their presence here solely to regular immigration, chiefly from the Mediterranean region.

During the past century several of our species have become extinct. There is some evidence that even more species have vanished over the past three hundred years as there is a strong tradition among Entomologists that butterflies such as the Scarce swallowtail (*Papilio podalirius* L.); the scarce and purple edged coppers (*Chrysophanus hippothoe* L. *C. Virgaurea* L.) existed in England during the seventeenth and eighteenth centuries. The habit of early authors on the subject to include Continental species in their books; their lack of labelling; the known importation of foreign specimens for display in their cabinets, makes it impossible today, over this distance of time, to prove conclusively whether or not these were ever British residents. In some cases the circumstantial evidence indicates that they were and there is a very strong case in regard to the Swallowtail.

It is now of course well known that the Swallowtail at present occurring on the Norfolk Broads (although it used to be widespread over the now drained fens) differs from the Continental race of Swallowtails. It is not to be confused with the Continental examples which are found from time to time in Southern England. These are stray migrants from France. *Papilio machaon* L. ssp *britannicus* Seitz and *P.m. bigeneratus* Verity respectively.

During the eighteenth century *Machaon* was a fairly common butterfly, not only on the fens and broads but also round London and in Southern England. Just over a century ago an illustrated book on butterflies was written by Messrs. Humphreys and Westwood and in some of the copies an English race Swallowtail is depicted whereas in others a Continental example is shown. In both cases the authors remark that the illustration is from a British example and it should be borne in mind that at this time Entomologists did not distinguish the two. One of the differences between the two races is the choice of food-plant, the English choosing two fenland plants and the Continental feeding on a variety of plants including carrot and rue. The latter plant was once commonly grown in gardens but is rarely found today. These facts therefore make it almost certain that the Swallowtails round London and the South were of the Continental race, which is now extinct.

The history of the extinction of the Large Copper (*Lycaena dispar* Haw.) is one of the best documented. This was a distinctive English butterfly that did not occur abroad. It inhabited the fenlands with a few outposts nearby. The last regular appearances were in 1845 and the last one was seen in 1860. Various reasons have been put forward for its disappearance. Primarily it has been frequently suggested that this was caused by overcollecting and persecution by Entomologists. There are various reasons why this was not so, and Muggleton (1973) has shown in the case of the Large blue (*Maculinea arion* L.) that the primary cause of extinction is the destruction of the habitat, massive collection of specimens having had little effect.

In the first place the Large copper was a fenland butterfly and by the time it was first discovered in 1795 the major part of the fens had already been drained. Secondly it was not seriously collected until some thirty years later by which time its area of distribution had already shrunk considerably. Its last stronghold was Whittlesea mere, an extensive and dense area of marsh, in which it was only possible to collect the butterfly round the fringes. Compared to other hazards such as parasites, disease and predators the percentage caught by collectors must have been a fraction of a per cent. Now it appears that before the mere was drained, in order to assist the work, the vegetation was burnt off. The roots of the Great waterdock survive this treatment but of course eggs, caterpillars or chrysalids on it would not. Now although

the butterflies were not seen for a year or two before the drainage this applied to the edges only and since, as I will explain later, butterflies expand and contract their range I believe, and the evidence supports this, that at this time the Large copper was contracting and that birds were the cause. By this time the drainage already carried out had caused a change in the climate of the fens making them drier, which in turn changed the bird population, many small insect eating birds moving in to replace the water-loving ones, this increase being helped by the simultaneous destruction of birds of prey in the sporting interest. It so happened that just before the Large copper emerged from the chrysalis it changed colour and became very conspicuous. At this stage it would be ignored by ducks and geese but would have been a tasty morsel for tits and robins. These birds could well have given the final coup-de-grâce. Fundamentally of course the primary cause was the drainage of the fens—originally an area of some 2,500 square miles incidentally—and this is fully borne out by the fact that half of our considerable number of extinct moths were fenland species.

The case of the Black-veined white (*Aporia crataegi* L.) is rather different to that of the Large copper. This was a hedgerow and orchard species whose caterpillars fed in colonies and it was formerly common over almost the whole of the Midlands and South. Apart from a small colony in East Kent which finally vanished about 1925 this butterfly became extinct over the rest of its range between 1870 and 1890. At about the same time a number of moths also became extinct and a climatic change has been put forward as being the most probable explanation. Other causes should not be neglected since an outbreak of disease is another possibility, and, moreover, one which may well be overlooked at the time. Virus disease has been stated by C. F. Rivers (1959) to cause 99 per cent mortality in Cabbage white caterpillars (*Pieris brassicae* L.) and it will strike suddenly after an absence of very many years as it did to this species in 1955 (see David, 1957). Indeed it is likely that in Southern England this species is saved only by immigration of fresh stocks. It is perhaps significant that the Cabbage white has not been a major agricultural pest since the outbreak.

In common with most animals, butterflies show a rise and fall in numbers and in the area of their distribution, the full cycle often extending over several decades. The Comma butterfly (*Polygonia c-album* L.) is a good example. During the last century it was fairly common and widespread but by 1920 it had shrunk to a small area near the Welsh border. During the next twenty years it suddenly spread outwards and by 1948 was again common over the Midlands and South. It may now be starting to contract again. A similar tale can be told of other of our butterflies.

Now it could well happen in such cases that when the butterfly is at

its minimum the population is then too small to weather the storm should some unforeseen disaster, such as disease, adverse weather, or insecticide spraying occur. It was just at this time when the Black-veined white was at a minimum that general spraying of orchards with insecticides became common and I believe that it was this which finally caused it to become extinct, before it had had time to spread again like the Comma.

I have already mentioned that about 20 per cent of our butterflies are only here because of immigration. These can be divided into two classes. Regular immigrants, usually in large numbers, such as the Red admiral (*Vanessa atalanta* L.), and occasional vagrants like the Queen of Spain fritillary. It is these occasional vagrants that are interesting since some of them, including the Queen of Spain fritillary (*Argynnis lathonia* L.) and Bath white (*Pontia daplidice* L.), were once established here and were caught regularly. Indeed the oldest butterfly in existence is a Bath white caught at Cambridge over 250 years ago. These butterflies still sometimes produce a generation here but conditions are not yet right to enable re-establishment to take place. It may well be that these butterflies represent yet further examples of the contraction and expansion that is continually taking place only in these cases the contraction phase took them right out of the British Isles.

The Large and Small (*P. rapae* L.) cabbage whites—those great pests of cabbages—are both resident and immigrant. It is unlikely that they would survive here if it were not for this immigration and since they are the only butterflies we have that are an economic pest many people would be quite glad to see them go.

The statement that only immigration sustains the Large cabbage white here needs some explanation. This not only illustrates the perils that butterflies in all their stages have to face, but also shows in what a delicate state of balance the population is in. It is quite easy to realise how a slight tipping of the scales can send a species into extinction.

In 1933, J. E. Moss showed that ten thousand larvae produced thirty-two butterflies. As each female is capable of laying just over 700 eggs (although some authors have put it much lower than this) a simple calculation shows that the population will barely maintain itself, assuming that every female lays all its eggs. Now there is one serious omission in this result of Moss's. It does not allow for any mortality of either eggs or adults. The chance that any butterfly will live long enough to lay its full quota of eggs is very remote. I know from personal observation that few butterflies can live their allotted span. Birds, wasps and mice will all eat them and who can say how many are killed by sudden thunderstorms? It is likely that the normal indigenous population declines by half each year and the butterfly would soon become extinct if we received no specimens from abroad. Indeed

there have been fewer about the last two decades due to lower immigration than usual, coupled with the virus epidemic already mentioned.

Now what are the causes (and they apply to all species of butterfly) that reduce ten thousand to thirty-two? First is the small parasitic wasp *Apanteles glomeratus* L., that accounts for about half of all the larvae. Wasps and ants also eat them but the Thrush is the only bird I know that likes these distasteful larvae. Disease, either bacterial or viral accounts for variable but often large numbers. Indeed I have already mentioned this being as high as 99 per cent so it is easy to imagine it as a cause of extinction. Those caterpillars that manage to turn into chrysalids then find that this stage too is attacked by bacterial disease and parasitic wasps. Also unlike the caterpillars the chrysalids are highly palatable and are enjoyed by a variety of birds as well as by mice.

It must always be remembered when considering all these enemies of a butterfly that the whole complex of parasites and predators is very involved and many of them are indiscriminate in their choice. For instance a lack of immigrant Large cabbage whites may well have led to greater parasitism of the Small white since the same *A. glomeratus* attacks both species.

All these causes have been operating for thousands of years and have on the whole maintained a balanced population. But apart from those species that have become extinct the butterfly population as a whole has declined drastically since the turn of the century and the reasons for this are undoubtedly man-made.

It is stated in the most popular and widely read book on British butterflies written by Richard South at the beginning of this century, that the young collector should be able to find half of the generally distributed species in one season. Today a quarter to a third would be a more accurate estimate. On Royston heath, once a celebrated locality for Blue butterflies where they could be seen in their thousands, it is now a privilege to see more than a hundred or so. In lanes and byeways, once so profusely populated from spring to autumn by Orange-tips, Hairstreaks, Marbled and other whites and Browns, these gems of the sun are few and far between. Even in the woodlands the numbers have declined. Now what are the reasons for this? Almost certainly the direct activities of Man.

More and more land is taken for houses and agriculture as well as roads. I well remember a rough field where I used to find the Adonis blue (*Lysandra bellargus* Rott.) when I was a boy. This field is now a housing estate and the Adonis blue has gone from this area of Kent.

Apart from this, extensive tree felling particularly during the two war periods, and the almost invariable replanting with foreign conifers, has changed the character of many woodlands. Changing agricultural

practices have caused some areas to become overgrown. Sheep droving for instance used to keep some of the old Roman roads open by grazing. Nowadays they are becoming overgrown chiefly with scrub Hawthorn. Today's pitiful remnants of the ancient fenland are more woodland than fen.

A more recent example, which illustrates the interaction of one form of life upon another is the decline of the Chalk-hill blue butterfly (*Lysandra coridon* Poda) which appears to be related to myxomatosis disease of rabbits. Large rabbit populations kept downland grass short and allowed free growth of vetch, foodplant of the larvae of these butterflies. Rabbit de-population has allowed grass to grow which has smothered the vetch.

The modern practice of cutting, trimming and spraying roadside verges also does harm to the butterflies. When this was done by scythe little harm was done to the insect inhabitants, but modern machinery and above all the deplorable practice of spraying with poisonous weedkillers has all but wiped out not only the butterflies but also the humble-bees, often with detrimental results to nearby crops they would have fertilised. The general spraying of crops with insecticides must also kill a vast number of butterflies. For instance I have known a cage of several hundred butterflies in a glasshouse to be killed when over a hundred yards away from a field by spray-drift and there has been a report in the papers about the dangers of poisoned blackberries near potato fields.

I was struck recently when on a visit to a relatively unspoilt part of Norfolk to notice that where the verges had been left in their natural state there was a pleasing profusion of both wild flowers and insects. It's also rather interesting to observe that the Mountain ringlet (*Erebia epiphron* Haw.) living as it does on remote hilltops in Scotland and the Lake District, where disturbance of the habitat has been at a minimum, continues to occur at about the same population level as when first found.

No population is ever static and constant changes are always taking place. There is well documented evidence that over the last sixty years there has been a contraction of the polar ice-cap and a recession of Alpine glaciers. This has been accompanied by a northward movement of animals and plants. On turning to our moths we find that although some thirty or so have become extinct twice this number of new species have moved in to replace them. That this hasn't happened with the butterflies is probably due to their smaller proportionate numbers. The Channel may also be a barrier to some species and this doubtless applies to some moths too. Dr. E. B. Ford has shown that even a small river estuary is an effective barrier to Meadow browns.

This leaves the question of the noted migrants. Why do they not

become established here? There are I think several reasons for this. In the case of the Milkweed *Danaus* the food-plant does not occur. The Clouded Yellows produce a continuous succession of broods and so can't survive our winter frosts. The Camberwell beauty (*Nymphalis antiopa* L.), a Scandinavian species requires a colder winter. On the other hand an occasional Red admiral manages to pass the winter here in hibernation.

Although one might believe that a good summer would encourage species from a more southerly latitude to become established they do in fact require a short mild winter in preference to a hot dry summer. The absence of parasites could also be an important factor for it seems that it is the absence of these in the breeding grounds that enables the vast swarms to be build up that migrate into this country.

What is to be the future of our butterflies? Some are very scarce and local, but were formerly far more widespread. The Glanville fritillary (*Melitaea cinxia* L.) for example is now confined to a few acres in the Isle of Wight and concern is already felt by Entomologists for the Large blue confined to a few localities in the West, one of which suffered from fire recently. I fear that in a few decades these lovely butterflies may be gone, but it is possible that some Central European species will establish itself. The Purple-edged copper has been spreading westwards; the Japanese tortoiseshell (*Nymphalis xanthomelas* Stichel) has reached Czechoslovakia and as mentioned at the beginning of this article there is a tradition that the former was once British. I like to think that one day it will return to us.

Brian O. C. Gardiner (225)

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LETTER TO THE EDITOR

With reference to the article 'An unusual habitat by W. Coster (Bulletin, Vol 32; No 301), I was interested in his bracketed question concerning the Elder plant. He asks "... does anything feed on this?

I have for some years been compiling an alphabetical list of food plants of the Macrolepidoptera, so that when I find larvae feeding on a particular plant, I can more readily identify them by narrowing the search, to species which are known to feed on that plant (well, it sounds fine, in theory!)

Having looked up Elder in my home-made (but sadly incomplete list) I found two moths which sometimes have been found on this plant. They are: *Gortyna flavago* Schiff., and *Melanchra persicariae* L. The former is a reference from Stokoe's *Caterpillars of the British Moths* and the other is from *South*. I thought Mr. Coster might be interested and perhaps have another look at his Elder plantation.

Ivor Brassington (4872)

Gleaned from various sources and from personal experience, I can find the following as having been recorded as feeding up on Elder (*Sambucus nigra*): *Pyrausta olivalis* Schiff., *Phlyctaenia sambucalis* Schiff; *Eupithecia albipunctata* Haw.; *Spilosoma lubricipeda* L.; *Ourapteryx sambucaria* L. Probably other normally polyphagous species would also accept this pabulum.—Ed.).

BOOK REVIEW

Wasps, An account of the biology and natural history of solitary and social wasps with particular reference to those of the British Isles by J. Philip Spradbery. Sidgwick and Jackson, London. 408 pages. 1973. £8.50.

Philip Spradbery's book covers the social wasps or Vespidae and the solitary wasps of the group Eumenidae. This is the first account of British social wasps since Ormerod's book in 1868 and is the first comprehensive account of the Eumenidae. After an introductory chapter on morphology and anatomy the Eumenidae are considered in terms of adult and nesting behaviour, foraging activities, development, parasites, predators and other associates. Next the social wasps are dealt with by studying queen hibernation, nest development, feeding and foraging, wasp populations and social organisation, males and females, parasites, predators and commensals and relationships with man. Other Vespidae of the world are covered briefly including the evolution of the social wasps. Appendices include keys to the 7 species of the Vespidae, the 22 species of the Eumenidae and the nests of social species; a check list; details of collecting, preservation and study of wasps and distribution maps of the British species based on the 10 km

square system. The bibliography is extensive and both an author and a subject index are present. 132 line diagrams, over 20 halftone and 10 colour plates are present although the colour is not always very good and the halftone plates have been poorly arranged.

However I would support Professor O. W. Richards in his Foreword to this book in saying that we have a very clear and extremely readable account of wasps which will serve not only as an introduction to our present knowledge but also as a guide for those who wish to make useful additions to the subject.

M.E.A.

NOTES AND OBSERVATIONS

Aphantopus hyperantus L. in Cambridgeshire: The Ringlet butterfly is stated in the Victoria County History of Cambridgeshire and the Isle of Ely to be common in woods and in Fen Drove at Chatteris. It has rarely been recorded from elsewhere in Cambridgeshire. Although I have never yet come across it in woods, it is a pleasure to record that its range in Cambridgeshire is far more extensive than would appear from the VCH. My experience of it is that it frequents open scrubland and old pathways. It has reappeared on Quy Fen, a locality illegally ploughed up some ten or twelve years ago and also occurs around Newmarket Heath (and I have seen it last year at Histon). This July in particular it was very common indeed along a footpath in the vicinity of Hardwick and numbers have also been noted on Wicken Fen.

Chris Gardiner (5249J)

I took a fine male *Celerio galii* von Rott. (Bedstraw Hawk) in my garden at Batheaston, Bath, at dusk on 13th June 1974. This moth was feeding on *Hesperis matronalis* (Sweet Rocket).

Bryan W. Moore (4344)

Antheraea pernyi G.M. in Cambridge:—An exceptionally large and finely marked example of this exotic Saturniid was found wild one morning in Cambridge at the beginning of August. In spite of full publicity, with its photograph, together with that of its captor, Mrs. Wylie-Crocker appearing in the local paper, nobody laid claim or admitted having lost it. The question arises as to when and under what circumstances new county records should be admitted. At present 'adventitious' is the most apt term to use, and in view of this being by no means the first occurrence in Cambridgeshire and the admittance of this category by 'Kloet & Hincks', a new county record can indeed be claimed!

Brian O. C. Gardiner (225)

NOTES ON BRAZILIAN INSECTS

Myrmeleontidae and Ascalaphidae

Ant-lions are common in Brazil. The inverted-cone traps in the ground, where the larvae live, below the apex, can be seen in abundance in areas of dry and dusty, sandy soil.

The winged adults, similar in general appearance to dragonflies, are also carnivorous, like their larvae. They do however, catch their food—consisting of small insects—in flight. They frequent open, grassy country and clearings in jungles, but do not seem to care for heavy jungle or bush. On a sunny day they may be seen weakly flitting about, apparently aimlessly, until by a sudden rapid dart to capture a tiny flying insect, they demonstrate how swift they can be.

I have come across *Grapha* ssp. (wing spans of $1\frac{1}{2}$ to $2\frac{1}{2}$ inches) most frequently in the North-East and South-East, in low country as well as in the highlands.

Ascalaphidae—Haplogenius ssp.

Similar to Myrmeleontidae in looks, but with much longer antennae, Ascalaphidae inhabit the same sort of terrain, and appear during the same periods. On a bright, hot day they inter-mingle with dragonflies and Myrmeleonids, reflecting the sun in tiny sparkles from their wings. The adult Ascalaphid's hunting habits resemble those of the Myrmeleonids; their larvae, however, live under bark and stones, and catch their prey without recourse to traps.

Two species that I have found in the North-East and South-East of Brazil are *Haplogenius lutens* and *H. hanlirshi* (the former having a 2-inch wing spread, and the latter, $3\frac{1}{2}$ inches).

The adult Myrmeleontidae and Ascalaphidae described appear to have almost identical habits: both fly at 2 to 6 feet above ground level and settle at the same height, usually on grass stalks or twigs. They both favour hot, sunny days during the periods just after the first showers which herald the season of heavy rains. They are attracted to light, especially during stormy weather, and one December night in 1958, at Mossoro, in Rio Grande de Norte, when the thunder and lightning preceding a terrific storm was at its height, these insects by the score invaded the brightly lighted saloon coach where I was dining, on the railway. Together with various small beetles, moths, etc., they had found their way through the venetian blinds to flutter around the lights and settle on the window frames and white table cloth. By the next morning, which was bright and sunny, most of them had disappeared.

Belostomatidae

In Brazil these brown water bugs go under the popular misnomer of *barata d'agua*, or water cockroach. Amongst them are found some of the largest species of Heterocera, *Lethocerus grandis* (4 inches) and *Lethocerus maximus* ($4\frac{1}{2}$ inches). Smaller members of the family are *Belostoma bascii* ($1\frac{1}{2}$ inches), and others down to $\frac{1}{2}$ inch and less in size.

They live underwater in still pools and marshes, and near the sides of sluggish streams, amidst the reeds, grasses and water vegetation. Being aquatic, their legs are flattened and adapted to powerful propulsion in water—especially the hind legs. The forelegs, consistent with their predaceous nature, terminate in a sharp claw for seizing the tadpoles, small fishes and larvae of other insects, on which they feed. They are armed also with a strong proboscis which can inflict a painful sting.

These insects are attracted to light, and fly to it, sometimes in very large numbers. In Pernambuco, more than once, at the start of the rainy season, I have seen *L. grandis* and *L. maximus* in their thousands, flying about in the verandas of the well-lit British Country Club in Recife, and shuffling about on the floors. On some of the better illuminated streets and pavements, too, it was difficult to avoid crushing several underfoot.

I have come across these two species in Alagôas, Pará and other States, but not in such hordes as in Pernambuco.

The females of some species of Belostomatidae attach their eggs with a strong adhesive on the backs of the males, who are thus obliged to carry them about until they hatch. I have seen this in the case of *Belostoma bascii*, and once took a specimen in the Serra do Curral, near Belo Horizonte, in a small spring-fed pool, who, poor fellow, was burdened with some sixty eggs. Under this tightly packed clutch his wings were sealed down, and he of course was unable to use them.

I have not, however, ever come across any other species of Belostomatidae in similar case.

Terence C. Hanson (5242)

LARVA CAGE FROM AUTOMOBILE AIR-FILTER

An interesting-looking package I spied in the forest proved to contain a used air-filter for a large vehicle. It had partly disintegrated and the metal frame was exposed. As this had a promising appearance, I cut away with a knife the plastic sealing rings from the top and bottom, discarded the paper filter and found myself with two perforated cylinders, the applicability of which to caterpillar rearing was immediately apparent.

The outer cylinder had a diameter of 25 cm. and a height of 26 cm., while the inner cylinder, of the same height, had a diameter of 20 cm. They were made of some galvanised material welded at the seam and were neatly perforated with holes 8 mm. in diameter. The appearance of the material was that of perforated zinc sheeting magnified several times. After a good wash in paraffin, followed by a soak in washing-up liquid and water, the cylinders were fitted with skirts of butter-muslin, carefully drawn down the cylinder to avoid snagging on the bare ends. Sufficient material was left at the top of each cylinder to enable a closure to be made by simply bunching the material together at the centre and then tying up with string. A piece of wood or glass would make a more solid top.

Used indoors they are best nailed on to a wooden base. Their main use, however, is probably in connection with potted foodplant, or with foodplant growing outdoors. In these cases the cage is simply pushed a short way down into the soil. The material tends to stain owing to the upward movement of water containing deposits from the soil, but it can always be artificially dyed in advance if required.

The fractional cost of the butter-muslin makes this a very cheap rearing system. Where one would normally obtain the discarded air-filters I do not know, but companies connected with earthworks or similar concerns in which giant machinery is in use might be able to suggest a local source for them.

Leigh Plester (2968)

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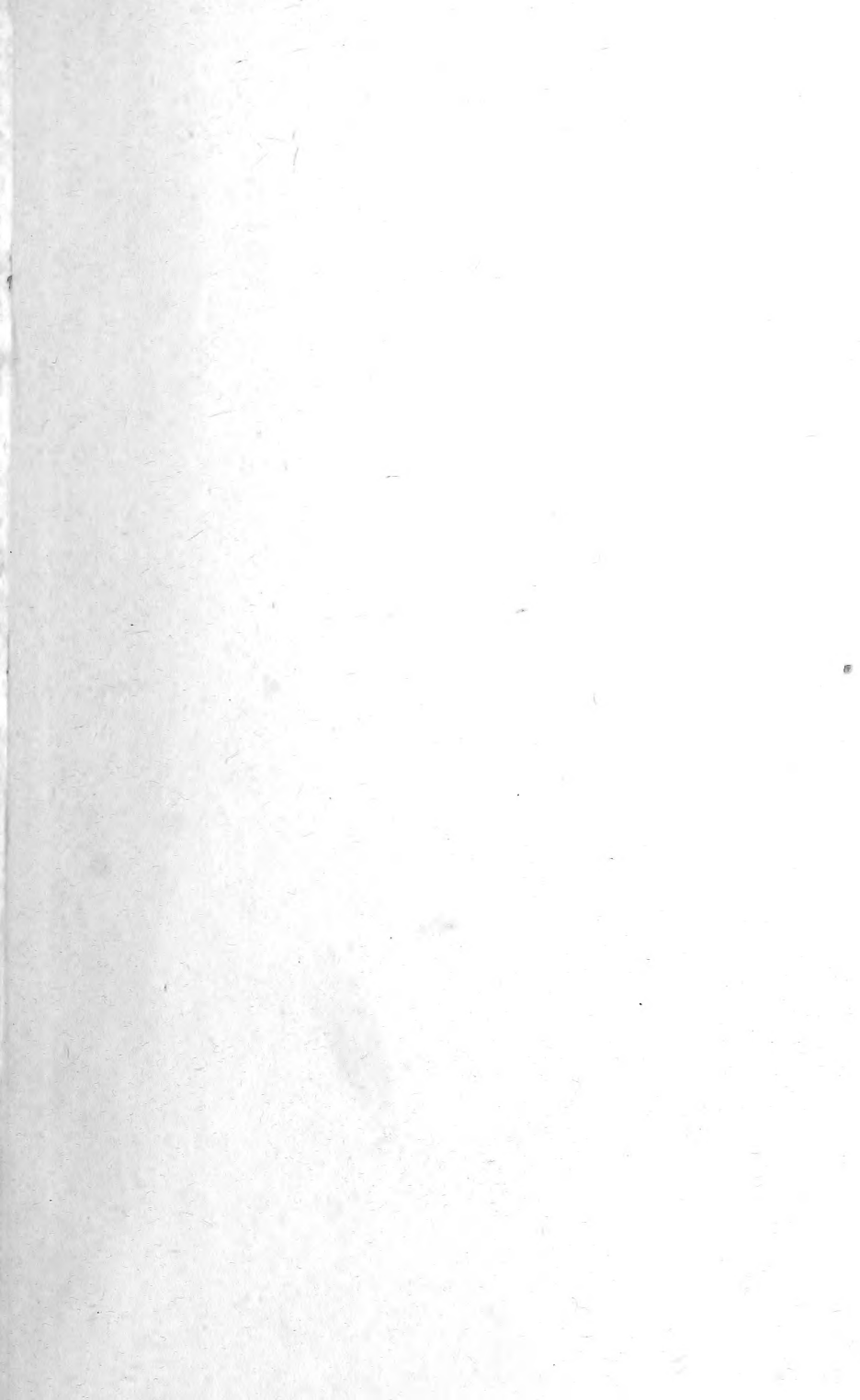
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